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Prevalence and incidence of alcohol dependence: cross-sectional primary care analysis in Liverpool, UK

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ABSTRACT

Objectives Liverpool has high prevalence of alcohol use disorders (AUDs) compared with the rest of the UK. Early identification and referral in primary care would improve treatment for people with AUD. This study aimed to identify changes in prevalence and incidence of AUD in primary care in Liverpool, to identify local need for specialist services.

Design Cross-sectional retrospective analysis of electronic health records.

Setting National Health Service (NHS) Liverpool Clinical Commissioning Group (CCG) primary care. In total, 62 of the 86 general practitioner (GP) practices agreed to share their anonymised Egton Medical Information Systems (EMIS) data from 1 January 2017 to 31 December 2021.

Participants Patients aged over 18 years with a SNOMED code for alcohol dependence (AD) or hazardous drinking (N=4936). Patients were excluded if they had requested that their data was not to be shared, and practices were excluded if they opted out (N=2) or did not respond to the data sharing request (N=22).

Primary and secondary outcomes Prevalence and incidence of AUD diagnoses in primary care over the 5-year period; demographic profile of patients (sex, age, ethnicity, occupation); GP postcode; alcohol-related medications; and psychiatric and physical comorbidities.

Results There were significant decreases in incidence of AD and hazardous drinking diagnoses over the 5 years ($p<0.001$ in all cases). Prevalence showed less change over time. Diagnoses were significantly higher in more deprived areas (Indices of Multiple Deprivation decile 1 vs 2–10). Overall pharmacotherapy prescriptions were lower than national estimates.

Conclusions There are low levels of identification of AUDs in primary care in Liverpool, and this is decreasing year on year. There was weak evidence to suggest patients in the most deprived areas are less likely to receive pharmacotherapy once diagnosed. Future research should seek to investigate practitioner and patient perspectives on barriers and facilitators to management of AUDs in primary care.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ This study used local primary care data which allowed us to capture seldom heard populations (eg, people who are homeless) in comparison to larger datasets where these populations are under-represented (eg, UK Biobank, Clinical Research Practice Database (CRPD)).
- ⇒ This study used general practitioner (GP) practice size when calculating incidence and prevalence to allow us to account for variations due to numbers of registered patients.
- ⇒ We used both GP postcode and individual patient-level residential location Indices of Multiple Deprivation deciles to calculate associations between social deprivation, incidence of hazardous and dependent drinking and receipt of pharmacotherapy.
- ⇒ The data is limited in that it cannot tell us if patients were offered and declined pharmacotherapy and the study cannot tell us why the incidence of alcohol use disorder diagnoses in primary care has decreased over the last 5 years. It should also be noted that the final 2 years in the analyses were during the COVID-19 pandemic, and changes in identification during this period could be affected by restrictions in healthcare settings.

INTRODUCTION

Harmful alcohol use (a pattern of alcohol use that causes damage to health) is a leading factor in premature death and disability worldwide.[1] In the UK, despite a small reduction in alcohol-related hospital admissions in 2020 during the COVID-19 restrictions, there was a 20% increase in alcohol-related deaths from 2019—the second highest number ever recorded. In addition, alcohol-related liver disease deaths increased by 58% compared with baseline.[2] Early identification of patients in primary care settings (eg, general practitioners (GPs)) and robust referral and support pathways would facilitate treatment access, with those who remain abstinent for a year or more after treatment presenting a low relapse risk.[3] However, identification of alcohol use disorders (AUDs) in primary care across the UK is low.[4 5]

There are numerous social and psychological factors which can affect alcohol-related harm, treatment seeking/access and completion. Globally, people of lower socioeconomic status are more likely to die or suffer from alcohol-related disease.[6–8] In the UK, social deprivation has been recognised as an important factor in alcohol-related harm, prevalence and treatment of alcohol dependence (AD) in previous research interrogating large databases (eg, the Clinical Research Practice Database and UK Biobank), with one study finding deprived areas have higher rates of AD diagnoses, higher mortality and less support for patients once diagnosed.[9] In this study, only 11.7% of participants were prescribed a relevant pharmacotherapy treatment, and those in the most deprived areas were less likely to be prescribed pharmacotherapy. The COVID-19 pandemic is likely to have further exacerbated social inequalities in access to AD treatment as services were forced to cancel face-to-face contact for individuals with AD, and the proportion of individuals drinking at higher risk levels reportedly increased over the course of the 12 months between March 2020 and 2021.[10] Liverpool, UK, is an example of a city likely to have been affected by these social inequalities as it has the 3rd highest prevalence (2.53 cases/100 people) of AD in England[11] and is also ranked as the 3rd most deprived local authority out of 317 across England.[12] As most of the UK population is registered with a GP, GPs are uniquely placed to identify patients with AUDs and treat or refer to appropriate services, and a clear picture of the incidence and prevalence of alcohol presentations in primary care, as well as associated sociodemographic variables, is needed not only to understand the impact of the COVID-19 pandemic on identification of AUDs but also to elucidate local inequalities in AUD presentations.

While the benefits of improving access to treatment are clear, the development of improvements that reduce social inequalities requires a careful prior analysis of AD incidence and AD sociodemographic patient profiles that also takes into account differences between GP practices. Our study sought to accomplish this by identifying the incidence of AD presentations in primary care in Liverpool, sociodemographic characteristics of patients, temporal trends in these variables and the association between sociodemographic characteristics and AD presentations and comparing these observations between primary care networks in Liverpool Clinical Commissioning Group (LCCG).

METHOD

Design, setting and study population

We conducted a cross-sectional analysis of anonymised GP electronic health records in Liverpool Clinical Commissioning Group and requested data from the 86 GP practices within the CCG. Practices provided us with routinely collected patient health data recorded via Egton Medical Information Systems (EMIS). Following the case definition of AD developed by Thompson *et al*,[13] records of individuals who fulfilled the following criteria were selected:

1. Were aged 18 years or over.
2. Had a SNOMED code for AD or consequences of AD (eg, alcoholic cirrhosis of the liver) between 1 January 2017 and 31 December 2021.

Patients were excluded if they had requested that their data was not to be shared (N=406 citywide), and practices were excluded if they opted out (N=2) or did not respond to the data sharing request (N=22), resulting in data being shared by 62 practices in total. Variables extracted from the EMIS system were: anonymised identifier; sex; age; ethnicity; postcode of registered GP practice; occupation; alcohol use metrics (related diagnoses, for example, Wernicke's encephalopathy, alcohol consumption, alcohol brief interventions, onwards referrals); medications to treat alcohol dependence (disulfiram, topiramate, acamprosate, baclofen, naltrexone); and major psychiatric and physical comorbidities.

Patient and public involvement (PPI)

The research team included active members of Liverpool Centre for Alcohol Research (LCAR). Through our engagement with local patients and stakeholders in LCAR, we invited Melissa Rice to join our team as an expert by experience. Through steering group meetings and project development updates, Melissa has been involved in the design of the study (offering expertise on the personal experience of accessing treatment in primary care and associated factors), has reviewed the manuscript and will be the PPI chair on our future work.

Procedure

After gaining institutional ethical approval, a data sharing agreement (DSA) was established between Liverpool John Moores University (LJMU) and NHS Liverpool CCG and reviewed and approved by the NHS Liverpool CCG Information Governance board. Individual practices were contacted by LCCG Business Intelligence team with a brief outline of the study and asked for consent to share their EMIS data with the research team on the 25 April 2022, with fortnightly reminders sent until the request closed on 23 June 2022. Anonymised data for identified cases from 1 January 2017 to 31 December 2021 were extracted from 62 practices by Liverpool CCG into a CSV Microsoft Excel file and sent to an NHS.net account belonging to a member of the research team (LO). Data was stored on a secure server only accessible to the research team and downloaded to a password protected network drive at LJMU. Figure 1 displays the data acquisition and processing figures.

Data analysis

All analyses were performed in R Studio.[14] For a more detailed description of database construction and SNOMED and free-text codes for hazardous drinking, please see readme file accompanying open access dataset (https://doi.org/10.24377/LJMU.d.00000140). All alcohol codes were reviewed by two researchers (CM and CS) and confirmed to indicate either AD (using the case definition in Thompson *et al*[13]) or harmful drinking.[15]

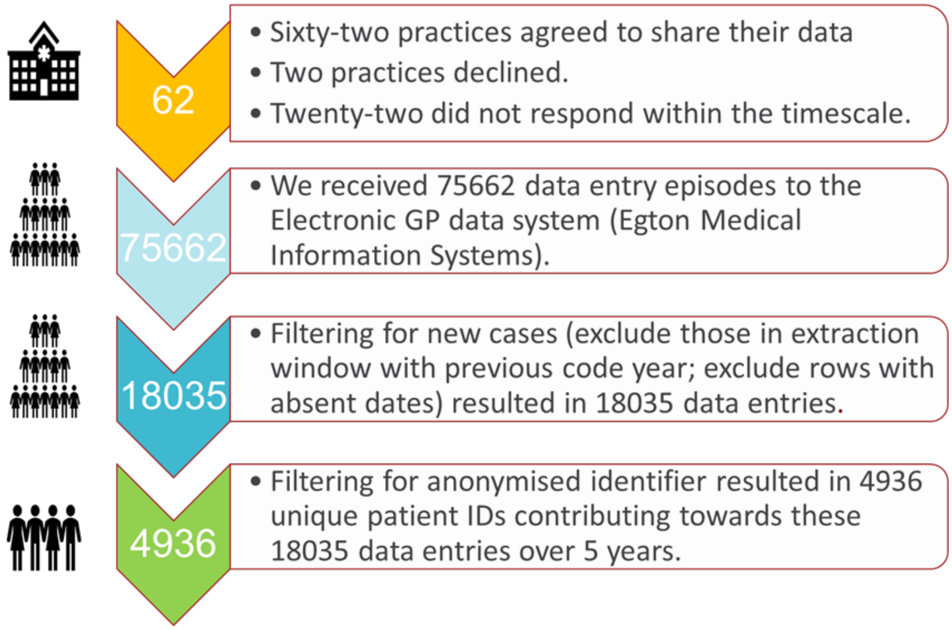

Figure 1 Data acquisition flow diagram. GP, general practitioner.

Where there was uncertainty in classification of cases, cases were discussed in the team and the clinical opinion of LO was used to assign cases to each category. Anonymised data was recoded to reflect: UK Census 2021 ethnic categories (ethnicity), Diagnostic Statistical Manual for Mental Disorders 5 classifications (psychiatric comorbidities) and year of first occurrence (2017–2021) of anonymised identifier (for incidence). GP postcode was recoded to reflect the 2019 Indices of Multiple Deprivation (IMD) for England deciles, based on the Lower Layer Super Output Area (LSOA) of the GP postcode. The IMD gives a single weighted score for the relative deprivation of a small geographical area (the LSOA) based on seven domains (income, employment, education, health, crime, barriers to housing and services, living environment). We also received patient-level LSOA codes, which were recoded to reflect the IMD decile of that LSOA. In the current study, IMD deciles were used in the main analyses with 1=most deprived and 10=least deprived. Descriptive data for all variables is presented as counts and percentages in table 1. We used count data for each category (hazardous drinking; AD) in each year (2017; 2018; 2019; 2020; 2021) and χ^2 goodness-of-fit test to compare incidence (new occurrence) and prevalence (total count) between each paired year, applying a correction for 10 multiple comparisons in each set (0.05/10).

We computed the proportion of individuals presenting to their GP practice with AD or hazardous use from the number of individuals aged over 18 years registered to that practice and the variance of this proportion using the 'escalc' function from the 'metafor' package in R. We conducted a random effects meta-analysis on the proportion of AD cases across 62 GP surgeries we had data for. In line with recommendations,[16] we transformed raw proportions using the arcsine square root transformation (escalc function 'PAS'), which serves to improve normality and stabilise variances in smaller samples. We report back-transformed proportions in text and raw proportions in figures to aid interpretation. The analysis script can be found here https://osf.io/7ywdz/ for use with the open access datafiles.

To examine whether deprivation was associated with the proportion of alcohol-dependence cases, we used the GP surgery postcode. We first used meta-regression analyses to examine whether IMD was associated with the proportion of alcohol-dependent cases, as well as hazardous drinking. Then, owing to a large number IMDs=1 (N=37, 59.7%), we conducted a subgroup analysis in which we compared IMD=1 versus IMD=2:10. We provide R^2 values for meta-regressions, which indicate the amount of heterogeneity in the models accounted for by the predictor (IMD). To examine whether any associations between IMD and alcohol-dependence were partially explained by demographic characteristics of the patient samples, we reran our meta-regressions to include the percentage of male (vs female) patients aged over 18 years registered in each surgery (mean=50.8%, min=46.1%, max=59.3%). We also examined the per cent of men and women who reported 'British or mixed British' as their ethnicity (vs other possible ethnicities) within that surgery. We chose this as it was the most commonly reported ethnicity. However, this analysis is exploratory as the quality of ethnicity reporting was poor (many surgeries reported missing ethnicity data).

Finally, in order to triangulate evidence, we also examined whether patient-level deprivation (using patient-level IMD data), average age and proportion of male patients were associated with prevalence of dependence, medication prescribing and hazardous drinking using meta-regressions.

Table 1 Demographic information, prescribed medications and co-occurring mental health diagnoses

	Male (N)	%	Female (N)	%
Gender	3173	64.30	1763	35.70
Age (years)				
18–24	30	1	26	1.5
25–34	316	10	150	8.5
35–44	626	19.7	386	21.9
45–54	878	27.6	497	28.2
55–64	857	27.0	441	25.0
64+	465	14.7	263	14.9
Ethnicity	**N**		**%**	
Asian or Asian British	47		1	
Black, black British, Caribbean or African	83		1.7	
Mixed or multiple ethnic groups	65		1.3	
White British or Irish	3997		81	
White European or other	159		3.2	
Other ethnic group	33		0.7	
Missing	552		11.1	
Medication (total)	311		6.3	
Topiramate	11		0.2	
Acamprosate	194		3.9	
Baclofen	97		2.0	
Disulfiram	4		–	
Naltrexone	5		–	
Onwards referral				
Referral to community	704		14.2	
Referral declined	117		0.3	
No referral information	4115		83.3	
Co-occurring mental health diagnoses	2250		45.6	
Depression/depressive disorders	36		0.7	
Anxiety states/anxiety disorders	1484		30.0	
Mixed depression and anxiety	272		5.5	
Obsessive compulsive disorders	26		0.5	
Feeding and eating disorders or problems	37		0.7	
Bipolar and related disorders	62		1.3	
Schizophrenia spectrum and other psychotic disorder or problems	158		3.2	
Personality disorders	6		0.1	
Trauma and stressor related disorders and states	136		2.8	
Alcohol-related mental disorders	20		0.4	
Other	11		0.2	
Physical disability	24		0.5	

RESULTS

Demographic characteristics of participants

The majority of alcohol diagnoses in primary care in Liverpool over the 5-year period were for male patients (64%) and most described their ethnicity as white British, white Irish or white other (84%). Across the sample, 6% were currently prescribed medication to manage their drinking, with acamprosate most commonly prescribed (3.9%). Coding of information relating to indices of alcohol use (using some variation of the Alcohol Use Disorders Identification Test (AUDIT) or a consumption score) and referral to other services were variable; while 14% or patients were coded as

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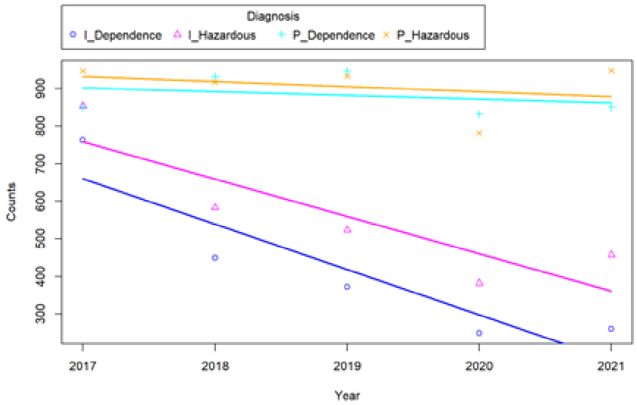

Figure 2 Changes in incidence and prevalence over the 5-year period.

'referral to community', the majority of patients did not have onward referral information. A small proportion (0.3%) declined referral to other alcohol services. Inspection of table 1 also shows that co-occurring mental health diagnoses were common, with 45.6% of patients having a SNOMED code for a coexisting mental health concern and anxiety states or anxiety disorders (30%) emerging as the most common concern.

Changes in prevalence and incidence

Figure 2 displays the incidence and prevalence counts for AD and hazardous drinking in each year. The slope of the lines suggests that while there were year on year decreases in new incidence from 2017 to 2020, there was less change in prevalence over the 5 years.

To assess if these changes in incidence and prevalence were significant between each year, we conducted χ^2 goodness-of-fit tests between each paired year (corrected for multiple comparisons). Test statistics and significance levels are displayed in table 2. Incidence of hazardous drinking diagnoses in primary care significantly decreased year on year from 2017 to 2020, with no significant difference between 2020 and 2021. Incidence of hazardous drinking decreased significantly year on year from 2017 to 2020, with a significant increase from 2020 to 2021. For prevalence of AD, there was a significant increase in prevalence between 2017 and 2019 and significant decreases in prevalence between 2018 and 2020 and 2019 and 2021. For prevalence of hazardous drinking diagnoses, 2020 was significantly lower than all other years.

Relationship between prevalence, alcohol-related prescriptions and GP surgery-level deprivation

To assess the relationship between social deprivation and prevalence of dependence diagnoses (reflecting overall GP caseload for AD in these areas), we used meta-regression analyses. Figure 3 displays the prevalence of AD in GP surgeries as a function of the GP surgery IMD decile, with the size of the points indicative of the number of patients (aged over 18 years) registered in that surgery. The pooled prevalence of alcohol-dependent cases across the 62 GP surgeries was 0.0059 (95% CI: 0.0052 to 0.0067; I^2=87.6%), or approximately 0.6%. There was a significant association between GP surgery IMD and prevalence rates (B=–0.0068 (95% CI: –0.0093 to –0.0042); Z=5.21, p<0.001, R^2=36.9%). The inclusion of per cent of men (vs women) registered to the surgery into the model was not a statistically significant predictor (B=0.0941 (95% CI: –0.0335 to 0.2218); Z=1.45, p=0.148) and did not explain any additional variance in the model (model R^2=37.9%). Similarly, neither per cent of men (B=0.0002 (95% CI: –0.0006 to 0.0010); Z=0.42, p=0.678) nor per cent of women (B=–0.0002 (95% CI: –0.0010 to 0.0005); Z=0.62, p=0.533) reporting as white British or mixed British were associated with dependence prevalence. Prevalence rates of dependence in the most deprived GP surgeries (IMD=1: prevalence=0.0074 (95% CI: 0.0064 to 0.0083))

Table 2 Chi square test statistics and significant for paired year comparisons in incidence and prevalence

	Incidence				Prevalence			
	Dependence		Hazardous		Dependence		Hazardous	
Comparison	χ^2	P value	χ^2	P value	χ^2	P value	χ^2	P value
2017 versus 2018	80.77	0.0001↓	48.07	0.0001↓	3.68	0.06	0.45	0.50
2017 versus 2019	134.70	0.0001↓	75.79	0.0001↓	5.13	0.02↑	0.09	0.76
2017 versus 2020	261.06	0.0001↓	174.71	0.0001↓	0.21	0.64	15.75	0.00↓
2017 versus 2021	247.32	0.0001↓	115.63	0.0001↓	0.00	1.00	0.00	0.98
2018 versus 2019	7.40	0.007↓	3.25	0.07	0.12	0.73	0.14	0.71
2018 versus 2020	57.80	0.0001↓	41.87	0.0001↓	5.67	0.02↓	10.88	0.001↓
2018 versus 2021	50.85	0.0001↓	15.27	0.0001↓	3.68	0.06	0.48	0.49
2019 versus 2020	24.36	0.0001↓	21.97	0.0001↓	0.12	0.73	13.46	0.0002↓
2019 versus 2021	19.85	0.0001↓	4.4	0.04↓	5.13	0.02↓	0.10	0.75
2020 versus 2021	0.23	0.63	6.70	0.001↑	0.21	0.64	15.93	0.0001↑

Arrows in the table indicate direction (increase or decrease) of significant change from the previous year.

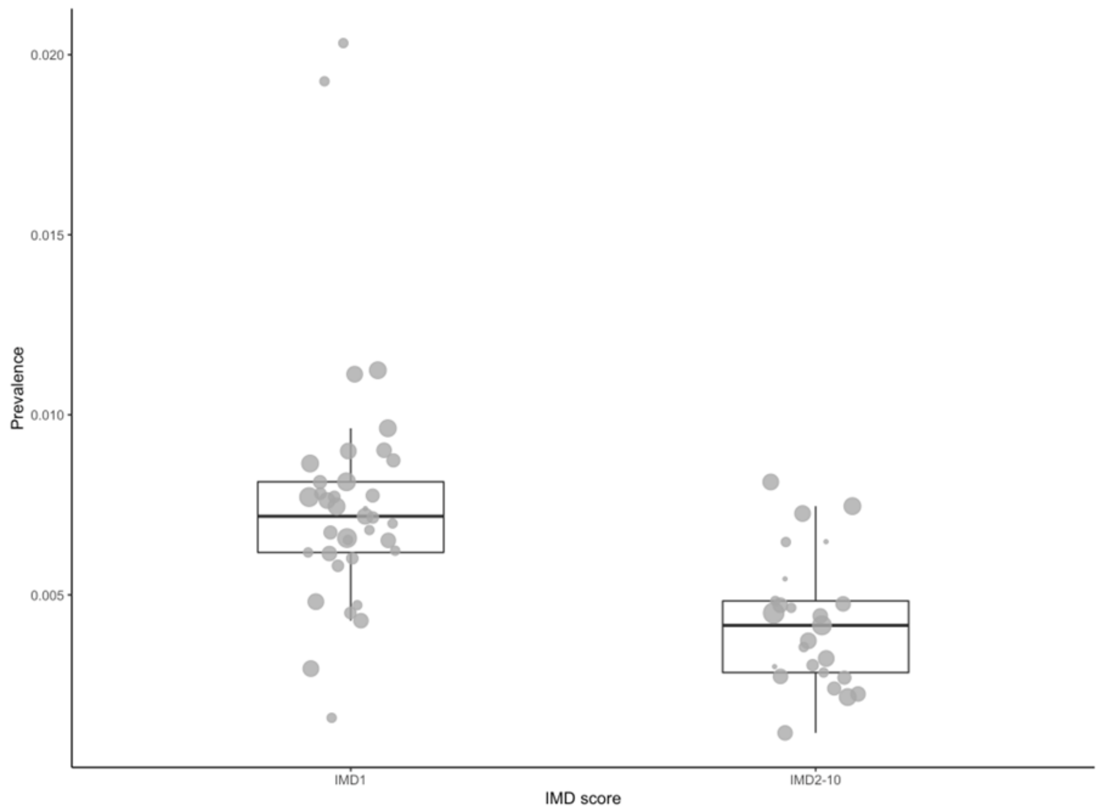

Figure 3 Prevalence of alcohol dependence in differing GP surgeries as a function of surgery IMD decile. GP, general practitioner; IMD, Indices of Multiple Deprivation.

were significantly higher than other GP surgeries (IMDs 2–10: prevalence=0.0040 (95% CI: 0.0033 to 0.0048); χ^2=28.50, p<0.001). This is indicative of ~84% increase in the prevalence of dependence diagnoses in GP surgeries in the areas of highest deprivation, see figure 3 (Removal of two outliers in IMD Group 1 (see Figure 3) did not influence the significance the overall subgroup effect (X2(1) = 30.28, p < .001), but slightly reduced the pooled prevalence (.0069 [95% CI: .0062 to .0072)).

The pooled prevalence for hazardous drinking across the 62 GP surgeries was 0.0078 (95% CI: 0.0069 to 0.0089, I^2=90.8%), or approximately 0.8%. There was a significant association between IMD and prevalence rates (B=–0.0059 (95% CI: –0.0092 to –0.0027), Z=3.59, p<0.001, R^2=19.1%). The inclusion of per cent of men (vs women) registered to the surgery was not a statistically significant predictor (B=0.0064 (95% CI: –0.1573 to 0.1702); Z=0.08, p=0.939) and did not explain any additional variance in the model (model R^2=17.5%). Similarly, neither per cent of men (B=0.0003 (95% CI: –0.0008 to 0.0014); Z=0.63, p=0.597) nor per cent of women (B=–0.0001 (95% CI: –0.0011 to 0.0009); Z=0.19, p=0.850) reporting as white British or mixed British were associated with hazardous prevalence. Prevalence rates of hazardous drinking in the most deprived GP surgeries (IMD=1: prevalence=0.0095 (95% CI: 0.0032 to 0.0190)) were significantly higher than other GP surgeries (IMDs 2–10: prevalence=0.0057 (95% CI: 0.0047 to 0.0067); χ^2=19.01, p<0.001). This is indicative of ~66% increase in the prevalence of hazardous drinking diagnoses in GP surgeries in the areas of highest deprivation.

We also used meta-regression to assess the relationship between social deprivation and receipt of alcohol-related prescriptions in those who have a diagnosis of AD. Figure 4 displays the number of alcohol-related prescriptions as a function of GP surgery IMD decile, with size of points indicative of number of AD diagnoses in that surgery. The pooled prevalence of alcohol-related prescriptions in patients diagnosed with AD across GP surgeries was 0.0663 (95% CI: 0.0528 to 0.0814, I^2=36.4%), approximately 6.6%. There was no significant association between GP-level IMD and receipt of alcohol-related prescriptions (B=0.0012 (95% CI: –0.0185 to 0.0209); Z=0.12, p=0.905, R^2=0.0%). The prevalence of alcohol-related prescriptions was not significantly different (χ^2(1)=0.15, p=0.706) between the most deprived GP surgeries (IMD=1: prevalence=0.0644 (95% CI: 0.0491 to 0.0817)) and other GP surgeries (IMDs 2–10: prevalence=0.0700 (95% CI: 0.0420 to 0.1045)). For hazardous drinking, the pooled prevalence of alcohol-related prescriptions was 0.0448 (95% CI: –0.343 to 0.0566). There was no significant association between IMD and receipt of alcohol-related prescriptions (B=–0.0106 (95% CI: –0.0282 to 0.0071), Z=1.17, p=0.240, R^2=0.1%). The prevalence was not significantly different (χ^2(1)=2.18, p=0.139) between the most deprived GP surgeries (IMD=1: prevalence=0.0506 (95% CI: 0.0385 to 0.0643)) and other GP surgeries (IMDS 2–10: prevalence=0.0340 (95% CI: 0.0165 to 0.0574)).

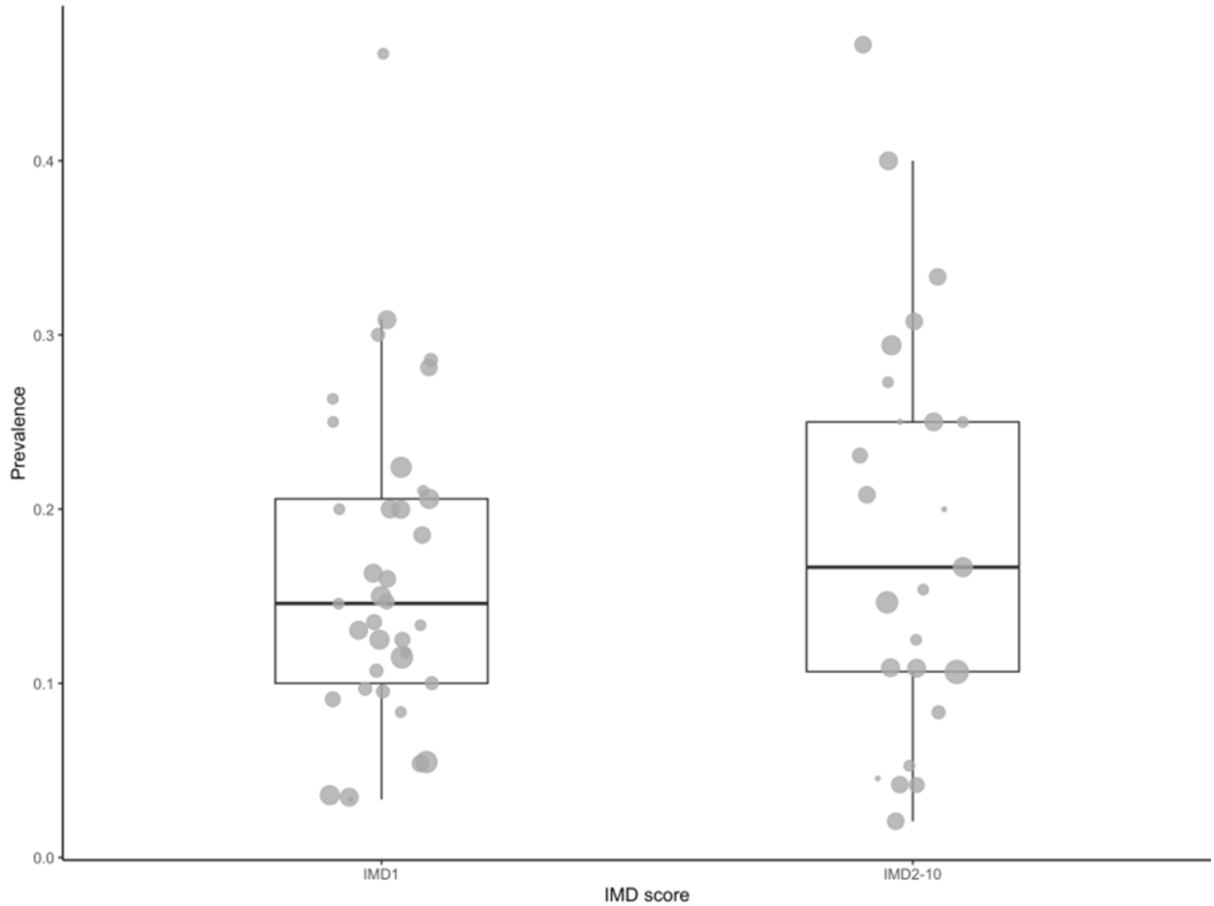

Figure 4 Proportion of alcohol-dependent patients receiving alcohol-related prescriptions in IMD1 surgeries versus IMD2:10 surgeries. IMD, Indices of Multiple Deprivation.

Patient-level deprivation analyses

We also performed meta-regression with patient-level indicators of deprivation, using the LSOA code related to the patient's residential location. There was a significant negative association between the prevalence of AD and IMD decile of patient LSOA (B=−0.0050 (95% CI: −0.0077 to −0.0024), Z=3.69, p<0.001, R^2=64.6%, see figure 5A). Mean age of dependent patients was not a significant predictor (B=0.0018 (95% CI: −0.0025 to 0.0060)), when included in the model (IMD remained significant (B=−0.0057 (95% CI: −0.0090 to −0.0024)). When including the proportion of men in the model, IMD remained a significant predictor (B=−0.0063 (95% CI: −0.0087 to −0.0039), Z=5.14, p<0.001) and the

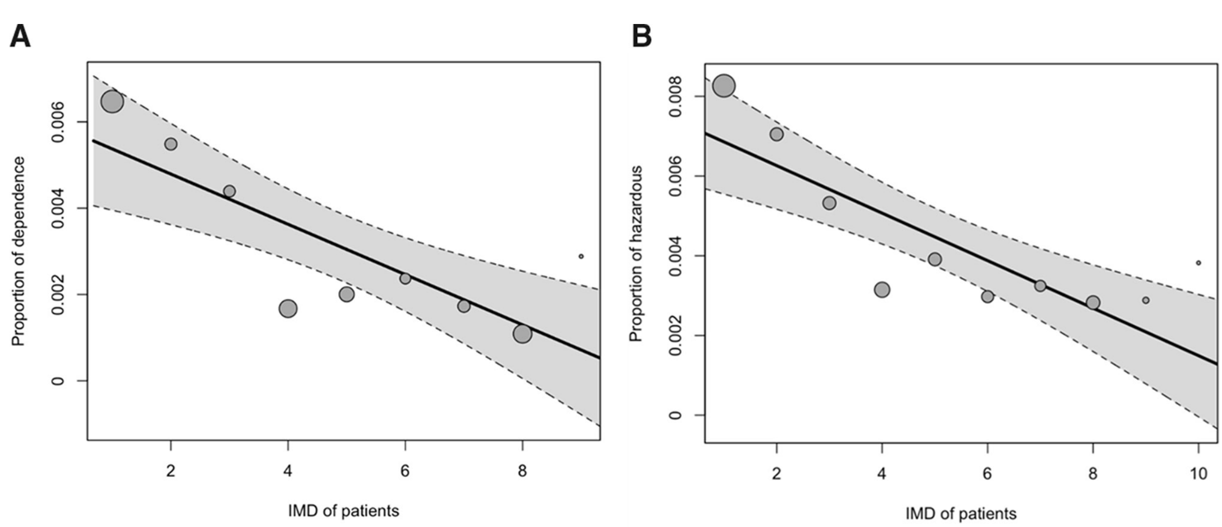

Figure 5 Meta-regression of patient-level IMD against (A) the proportion of dependence and (B) proportion of hazardous drinking. IMD, Indices of Multiple Deprivation.

proportion of men was a significant negative predictor (B=−0.0638 (95% CI: −0.1239 to −0.0037), Z=2.08, p=0.038, R^2=0.78.2%). Examining the prevalence of medication for AD demonstrated a weak positive association with IMD decile of patient LSOA (B=0.0134 (95% CI: −0.0013 to 0.0289), Z=1.79, p=0.073).

There was a significant negative association between the prevalence of hazardous drinking and IMD score (B=−0.0045 (95% CI: −0.0063 to 0.0026), Z=4.66, p<0.001, R^2=74.5%, figure 5B). Mean age of the hazardous drinking patients was not a significant predictor when included in the model (B=0.0015 (95% CI: −0.0008 to 0.0039)), but IMD remained significant (B=−0.0054 (95% CI: −0.0077 to −0.0032)). When including the proportion of men in the model, IMD remained a significant predictor (B=−0.0056 (95% CI: −0.0074 to −0.0039), Z=6.23, p<0.001) and the proportion of men was a significant negative predictor (B=−0.0658 (95% CI: −0.1272 to −0.0045), Z=2.10, p=0.036, R^2=85.3%).

DISCUSSION

This study found that in primary care in Liverpool, there have been significant decreases in the incidence of AD and hazardous drinking diagnoses from 2017 to 2020. Changes in prevalence were more subtle with significant decreases in 2020 due to the COVID-19 pandemic, but not other years during the analysis period. Most presentations were from white men, and almost half of the samples had a coexisting mental health diagnosis. Only ~6% of patients in the sample were prescribed pharmacotherapy to manage their drinking. GP surgeries in the most deprived areas of Liverpool had significantly higher prevalence of AD diagnoses per registered patient than those in other IMD deciles.

A strength of the current study is the identification of practices within Liverpool, situated in areas of high social deprivation which should be prioritised for additional funding and support for the management of alcohol patients. We also demonstrated year on year decreases in identification of both hazardous drinking and AD in primary care over the last 5 years despite smaller changes in prevalence. This suggests that while GP caseload for alcohol patients remains at a similar level as was 5 years ago, this is due to existing patients with AD diagnoses and not identification of new cases. However, the study was limited by the variations in coding of data. We had intended to analyse changes in consumption and AUDIT scores over the 5-year period, but it was not clear which item/combinations of items had been used for collection of this data between and within practices. Reporting of onward referrals and follow-up plans were also variable, with all patients having a code that indicated referral to Liverpool Community Alcohol Service. There are multiple community treatment providers, private providers and a hospital-based alcohol care team which accepts the day referrals. Understanding which of these organisations a patient has been referred to would increase our understanding of local need for these services. Using primary care data is also limited as there may be variability in individual practitioners' perceptions of hazardous versus dependent drinking,[5] and with limited time per patient and no standardised diagnostic procedure, this is unlikely to change. We also cannot know for certain the reasons for low levels of pharmacotherapy prescribing, and it is likely that other factors (GP experience, local practice policies, patient wishes, medicine status on Pan Mersey Formulary) affect the prescribing of pharmacotherapy to manage dependence. For patients who visit the Alcohol Care Team (ACT), pharmacotherapy is initiated in all post-detox patients, with follow-up managed in an outpatient clinic, so it is feasible that patients who access this service would be reported in hospital data and not primary care data. Finally, the final 2 years of primary care data were for incidence and prevalence of alcohol diagnoses during the COVID-19 pandemic. It is likely that due to the increases in drinking during this time, these figures are an especially low reflection of actual prevalence and incidence.

Increasing access to treatment in primary care as well as treatment acceptability and completion would reduce alcohol-related harm and also alcohol-related hospital admissions, a health outcome that has been given not only local but also national and international priority. While nationally, prevalence of AUDs has increased with subsequent increases in alcohol-related mortality and disease,[2 10] a trend which has also been observed globally,[17] we have demonstrated local decreases in the incidence of diagnoses identified in primary care over a 5-year period. While previous research suggests that identification in primary care is low nationally,[4 5] the significant year on year decreases indicate that this problem is escalating in Liverpool, an area of already high need. National Institute for Health and Care Excellence (NICE) guidelines[18] recommend the prescribing of pharmacotherapy to manage AD, with previous studies interrogating large national databases finding that 11.7% of patients with AD nationally are prescribed pharmacotherapy.[9] Moreover, evidence suggests that these medications are effective in delaying return to drinking[19] and reducing the length of inpatient stays for detoxification and frequency of hospital visits in those who have received a prescription.[20 21] In our study, we identified lower levels of prescribed pharmacotherapy (6.3% across the whole sample) than national averages. Despite patients in the most deprived areas of Liverpool being more likely to be diagnosed with AD, there was weak evidence (p=0.07) that these patients were less likely to be prescribed medication, based on their patient-level IMD but not based on GP surgery-level deprivation.[9] From 2019/2020 to 2020/2021, there was a 1% increase in the number of alcohol-related prescription items (acamprosate, disulfiram, nalmefene),[22] but compared with 2014 and 2015,[23] this represents a 15% decrease in overall prescriptions. Studies from the USA have indicated that primary care engagement is associated with increased alcohol-related prescriptions[24] and future research should seek to investigate how we can facilitate this engagement.

Our results highlight low and decreasing levels of identification of AUDs in primary care in Liverpool. Low identification and onwards referral have been identified in primary care across Europe and the USA[25 26]; this is problematic as specialist services will not be able to estimate demands based on primary care intelligence and services will be underfunded.[5] We identified specific areas in Liverpool which have higher levels of incidence and prevalence and would benefit from assertive outreach.[27 28] Levels of alcohol-related prescriptions in primary care were low compared with national estimates[9 22] and were somewhat lower for patients with higher levels of deprivation. GP training surrounding identification and prescribing for AD, improved coding practices in the EMIS system and discussion with leading pharmacists to develop guidelines on the Pan Mersey Formulary for prescribing alcohol management medication are key priorities identified by this work. A reduction in drinking brought about by improved identification and referral in primary care would also reduce the associated health conditions that arise from heavy drinking such as cardiovascular disease, cancer, liver disease, accidents, violence and self-harm.[29] In combination, these reductions would result in cost savings, improved patient care and treatment pathways, improved mental health and would lessen social inequalities.

In conclusion, this research highlights the association between social deprivation and prevalence and incidence of hazardous and dependent alcohol drinking. Future research should seek to identify perceived barriers and facilitators of access to treatment in primary care from both patient and practitioner perspectives, to identify specific local, national and international need for different treatment pathways for hazardous and dependent drinkers.

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Contributors CM and MR designed the study with input from PS and NVG. LO and RY contributed a pragmatic critique of the study inclusion/exclusion criteria and gave their clinical opinion on cases where there was uncertainty surrounding the meaning of manual codes. LO advised on the meaning of ambiguous referral codes and received the data from LCCG. CS was a research assistant working on the project who was responsible for recoding the data received from LCCG, initial data filtering and curation. RY provided expertise on the identification of general practitioner training needs and changes in local practice. AJ contributed to data curation, analysis and analytical strategy and reporting. MR advised the team on the relative importance of different factors from a patient perspective. CM produced the first draft of the manuscript and NVG, PS, AJ, RY, MR and LO have provided critical revisions and approved the final manuscript. CM is the overall guarantor of the content.

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