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Substance misuse, health service contact and risk of mortality: A data linkage study in Wales

Data Report

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Acknowledgements

This report is a joint publication between Public Health Wales, ADR Wales, the Secure Anonymised Information Linkage (SAIL) Databank and Welsh Government as part of the Better Outcomes through Linked Data (BOLD) programme. BOLD is a HM Treasury funded, cross-governmental programme (2021-2025) designed to demonstrate how people with complex needs can be better supported by linking and improving the government data held on them in a safe and secure way.

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Background

Substance misuse is an acknowledged public health problem which continues to grow as a worldwide issue.[1] Substance misuse is defined as 'recurrent use that is causing actual harms (negative consequences) to the person (including dependence, but also other health, psychological or social problems), or is placing the person at a high probability/risk of suffering such harms. As such, substance misuse contributes to a range of adverse health outcomes including other diseases (e.g. infectious diseases) and increased risk of suicide, violence and injury. All of which can directly or indirectly increase risk of mortality.[2] Substance misuse is a leading cause of premature mortality and morbidity.[3]

This Data Insight presents the findings of a study conducted as part of the BOLD Substance Misuse Demonstrator Pilot (Phase 1) in Wales, which focuses on early intervention and prevention of escalation of substance misuse. Further information on the BOLD programme can be found here: Better Outcomes Through Linked Data (BOLD)

This research, focussing on mortality, forms part of a larger study examining the type and timing of healthcare service contact prior to the start of problematic or enduring substance misuse in order to identify missed opportunities for prevention of escalation and promote earlier engagement to reduce substance misuse related harm including death.

What we did

We used a retrospective population-based cohort study design to identify a Welsh-resident cohort with evidence of substance misuse (aged ≥10 years) who died between 2010 and 2019 by linking different health datasets.

We used routinely collected administrative health data from the Secure Anonymised Information Linkage (SAIL) Databank for the study. Datasets used include primary care, hospital admissions, emergency department (ED), specialist substance misuse treatment and death records.

In this study, we analysed visits to health services related to substance misuse across different types of healthcare service providers in Wales. We examined how these visits affected the subsequent risk of all-cause death, death due to drug misuse, death from alcohol-specific causes, and suicide.

An individual was defined as having a substance misuse event if their GP or hospital

records contained a code relating to alcohol and/or drug misuse. Drug misuse was further stratified into: 'opioids', 'stimulants', 'cannabinoids' or 'other'. The Office for National Statistics (ONS) code lists were used to identify alcohol-specific and drug misuse deaths. Suicide was established by using previously validated codes developed by the Adolescent Mental Health Data Platform.

We analysed recorded substance misuse events within each of the health datasets separately to investigate whether the point of contact affected mortality risk. For example, an individual first seen in ED, and later during a hospital admission (secondary care) would be included in both ED and secondary care cohorts.

We estimated the risk of mortality (all-cause, alcohol-specific, drug misuse death and/or suicide) amongst individuals with a history of substance misuse. We also assessed whether the timing of the first health contact related to alcohol and/or drug misuse affected mortality. We adjusted the models for sex, age at first substance misuse, ethnicity and Welsh Index of Multiple Deprivation (WIMD) quintile.

What we found

A higher proportion of individuals with a substance misuse-related health event died prematurely compared to the general population.

Substance misuse is associated with increased risk of premature death from all causes, potentially due to the impact of substance use on physical and mental health more broadly, and deaths that are specifically substance misuse related and suicide.

During the study period, 16,229 people died. A high proportion of these individuals died prematurely, aged under 75, compared to average life expectancy rates[1]. For males and females in the cohort, all-cause mortality rates in those aged under 75 years were 69.3% and 61.5% respectively, compared to rates in the general population of 39.8% (males) and 26.4% (females) over the same period.[2] Cardiovascular and respiratory diseases were the most common underlying causes of death. However, within the top ten underlying causes of death, two were directly related to alcohol consumption: alcoholic liver disease (3.1%) and alcoholic hepatic failure (2.6%).

Of those where underlying cause of death was recorded as specifically substance use-related, or due to suicide, the median age of death was:

[1] Office for National Statistics. National life tables – life expectancy in the UK: 2020 to 2022. Available at: UK average life expectancies 2020-22

[2] Office for National Statistics. Deaths registered in England and Wales. 2023. Available at: ONS deaths registered in England and Wales

- alcohol-specific deaths - 58 years
- drug misuse deaths - 38 years
- suicide - 42 years

Substance misuse-related health care contact and substance-related mortality

Over the same study period (2010-2019), according to ONS mortality data, there were a total of 1,611 drug misuse deaths and 3,846 alcohol-specific deaths recorded in Welsh residents. Amongst the cohort with their *first* substance misuse health events recorded, 25.3% of drug misuse deaths and 43% of alcohol-specific deaths are represented in the ONS data. This indicates that around three quarters of drug misuse deaths and over half of alcohol-specific deaths in Wales were amongst individuals with no identified substance misuse-related health contact with primary or secondary health services, or specialist substance misuse services in *at least* the five years prior to death. This may reflect the diseases sequelae of alcohol use where alcohol-specific deaths may be preceded by healthcare contact, whilst drug misuse may reflect acute events, therefore there is less expectation of prior healthcare contact. These findings should be interpreted with caution because of the study design. People with past substance misuse health events (before 2010) have been excluded, and it is possible that these people make up a proportion of these deaths.

Those in contact with specialist substance misuse treatment for alcohol misuse were at greatest risk of suicide and drug misuse deaths, indicating additional complexity in relation to mental health and the use of and dependence on multiple drugs.

Higher proportions of deaths were recorded in the most deprived areas

46.8% deaths were amongst those resident in the most deprived areas compared to 28.9% in the least deprived areas of Wales. This is consistent with previous findings demonstrating a clear relationship between deprivation and life expectancy, with more deprived areas have worse mortality rates and substance-related deaths.[4]

Late initial presentation with alcohol or drug misuse in secondary care increases risk of all-cause mortality and cause-specific mortality (alcohol-specific deaths, drug misuse deaths and suicide)

We considered individuals presenting with alcohol misuse and those presenting with drug misuse separately.

For those presenting with alcohol misuse, compared to individuals whose initial alcohol misuse health service contact was primary care (GP records):

- Those who were initially identified during a hospital admission had the greatest risk of all-cause mortality and alcohol-specific death. This strengthens the evidence for consistent provision of alcohol liaison roles with emergency and secondary care.
- Those who were initially identified via Emergency Department and Substance Misuse treatment records had reduced risk of all-cause mortality.
- Those who were initially identified via Substance Misuse treatment records showed elevated risk of suicide and drug misuse deaths.

For those presenting with drug misuse, compared to individuals whose initial drug misuse health service contact was primary care (GP records):

- The strongest risk of all-cause mortality was in those initial presentations with drug misuse in secondary care/hospital admissions records, followed by Emergency Department events. Individuals may be hospitalised due to concurrent diseases associated with substance misuse, including infectious diseases, or the impacts of longer-term use of substances on health, as demonstrated in the elevated risk of all-cause deaths. However, in relation to drug misuse deaths, individuals may also be liable to continue their drug use following discharge from hospital, resulting in drug overdose death following a period of abstinence.
- Those who were initially identified via Substance Misuse treatment records had reduced risk of all-cause mortality.
- Only an Emergency Department health event of drug misuse was associated with elevated risk of alcohol-specific deaths indicative of the use of multiple substances.

Potential underestimation of the excess mortality related to the use of alcohol or illicit drugs.

For individuals with a health record of alcohol and/or drug misuse, the risk of cause-specific mortality was much lower than risk of non-substance use-related mortality. This may be due to the increased likelihood of drugs or alcohol being recorded as contributing to cause of death rather than the underlying cause of death. As such, this is likely an underestimate of the excess mortality related to the use of alcohol or illicit drugs.

Why it matters

We provide evidence of clear targets for policy intervention concerning sociodemographic profiles and health service utilisation:

Elevated proportions of mortality were shown amongst individuals from areas with higher levels of deprivation

It is already well-established that socio-economic inequalities have a detrimental impact on an individual, with deprivation and poverty explaining significant increases in drug misuse deaths.[5] Measures to reduce social inequality and poverty at a local level are required; in particular, policies which attempt to address social exclusion and pay close attention to high-risk areas. In 2018, a review of the substance misuse services in Wales found that there was limited access in rural areas, highlighting the need for more comparable access to services across the whole of Wales.[6]

Target interventions as early as possible to prevent acute drug deaths and development of the chronic conditions associated with alcohol-related deaths

Closer inspection of age profiles shows 25-55 year-olds dominated those who had drug misuse deaths or suicide (29.2%). This pattern was slightly different amongst those who had alcohol-specific deaths, which largely consisted of 55-64 year-olds (32.7%). Taken together, these findings highlight the need to target interventions as early as possible to prevent acute drug deaths and the development of chronic conditions associated with alcohol-related deaths. These individuals may be at increased risk of mortality due to structural barriers to accessing treatment and support, including stigmatisation by employers and treatment appointments during work hours.[7]

Complex needs requiring inter-agency support

Individuals with substance misuse often present with complex needs, for example, co-occurring mental disorders, and require strong inter-agency services. Despite this, services are often challenged when dealing with dual diagnosis, not only increasing the vulnerability of the patient but also a missed opportunity.[8] It is therefore important to integrate and facilitate close collaborations between various areas including primary and secondary care, social, mental health and housing services.

Effective information sharing systems with associated digital tools are necessary for collaborations across organisations and professions. Improved coordination could prevent or reduce substance misuse from developing and escalating, as well as allowing for more easily accessible treatment, and as a result improve the overall health and well-being of an individual.

Our results provide an indication of service needs that would aid planning and provisioning of services. The healthcare services require support and resources to treat co-occurring conditions associated with substance misuse disorders, particularly

in relation to provision of psychosocial support, which we highlight as an important factor given the high proportion of suicides. It is important to be able to distinguish substance misuse problems due to physical or mental health, allowing for more appropriate and individual-based treatments. Moreover, previous work has suggested the need for universal formal screening in hospitals for drug and alcohol-related issues. Without it, many drug and alcohol-related problems are likely to be missed and not receive appropriate treatment.[9]

Early and low threshold interventions

These findings also highlight the need for greater focus and engagement such as increased screening for substance use and provision of early and low threshold interventions and services to engage with individuals early to prevent or reduce escalation of substance use and reduce avoidable and premature mortality.

What next?

Expansion of linked data

In future, it should be possible to link this cohort with the Ministry of Justice data, to investigate those who have been in contact with the criminal justice system as initial contacts for the identification and recording of substance misuse. This is likely to expand the cohort and impact on the mortality data and implications in relation to early engagement.

Further research is required to address the current under-reporting and consequential underestimation of substance misuse related deaths, this may involve mixed method analysis of contributory causes of deaths with ONS and Coronial records.

Address potential bias

Due to issues with the data quality, we may have introduced potential biases into our work. For example, there is very poor recording of ethnicity across the datasets. It is well established that ethnic minority groups are more likely to have missing or incorrect recorded ethnic data, which is likely to contribute to bias.

There are also high levels of substance misuse amongst unstably housed or homeless populations. Although we tried not to introduce further bias by excluding those without a registered address, future work could look at published methods which have previously been used to identify the homeless population in the SAIL Databank.

It is worth noting that this is a difficult population to identify in linked data work due to their lack of residency and it may have been possible that we were not able to capture these individuals in their entirety.

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Appendices

Appendix A: Demographics of individuals who died during the study period, stratified by specific causes of death

Causes of death		All-cause		Alcohol-specific death		Drug misuse death		Suicide	
		Number (n)	Percentage (%)	Number (n)	Percentage (%)	Number (n)	Percentage (%)	Number (n)	Percentage (%)
Total		16,229	100	1,653	10.2	407	2.5	1020	6.3
Sex	Female	5,394	33.2	659	39.9	101	24.8	288	28.2
	Male	10,835	66.8	994	60.1	306	75.2	732	71.8
Age (at death)	Median	68	-	58	-	38	-	42	-
	10 - 18	40	0.2	[c]	[c]	9	2.2	21	2.1
	19 - 24	189	1.2	[c]	[c]	41	10.1	99	9.7
	25 - 34	518	3.2	61	3.7	119	29.2	216	21.2
	35 - 44	798	4.9	171	10.3	101	24.8	222	21.8
	45 - 54	1,786	11.0	404	24.4	74	18.2	228	22.4
	55 - 64	3,152	19.4	540	32.7	35	8.6	142	13.9
	65 - 74	4,342	26.8	360	21.8	21	5.2	59	5.8
	75 - 84	3,346	20.6	101	6.1	[c]	[c]	22	2.2
	85+	2,058	12.7	[c]	[c]	[c]	[c]	11	1.1
Ethnicity	White	10,258	63.2	1,060	64.1	336	82.6	795	77.9
	Asian or Asian British	35	0.2	[c]	[c]	[c]	[c]	[c]	[c]
	Black; African; Caribbean or Black British	49	0.3	[c]	[c]	[c]	[c]	[c]	[c]
	Mixed ethnic groups	28	0.2	[c]	[c]	[c]	[c]	[c]	[c]
	Other ethnic group	29	0.2	[c]	[c]	[c]	[c]	[c]	[c]
	Ethnic minorities combined[α]	-	-	8	0.5	[c]	[c]	9	0.9
	Information not obtained/Missing	5,830	35.9	585	35.4	[c]	[c]	216	21.2
WIMD (at death)	1	4,018	24.8	427	25.8	145	35.6	303	29.7
	2	3,571	22.0	407	24.6	86	21.1	215	21.1
	3	2,891	17.8	266	16.1	62	15.2	193	18.9
	4	2,511	15.5	236	14.3	36	8.8	124	12.2
	5	2,174	13.4	206	12.5	31	7.6	106	10.4

[c] masked to prevent disclosure of counts <5, **Due to small numbers, Black; African; Caribbean or Black British, Asian or Asian British, Mixed ethnic group and Other ethnic group have been combined.
Abbreviations: WIMD = Welsh Index Measure of Deprivation

Top 10 underlying causes of death	Malignant neoplasm of bronchus or lung, unspecified	993	6.1	
	Atherosclerotic heart disease	650	4.0	
	Chronic obstruct pulmonary disease with acute lower respiratory infection	508	3.1	
	Alcoholic liver disease, unspecified	507	3.1	
	Acute myocardial infarction, unspecified	507	3.1	
	Unspecified dementia	454	2.8	
	Chronic ischaemic heart disease, unspecified	449	2.8	
	Alcoholic hepatic failure	419	2.6	
	Chronic obstructive pulmonary disease, unspecified	402	2.5	
	Pneumonia, unspecified	395	2.4	
Substance related causes of death	Alcohol-specific death	1653	10.2	
	Drug misuse deaths	407	2.5	
	Suicide	1020	6.3	

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