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Is Mental Health Multimorbidity Associated with Contact with Healthcare Services Before Suicide? Retrospective Analysis of Irish Coronial Data, 2015–2020

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Abstract

Objective

Healthcare services are potential interventions points before suicide. The aim of the current study was to explore whether mental health (MH) multimorbidity is associated with contact with healthcare services before suicide.

Methods

A retrospective study was conducted using data from the Irish Probable Suicide Deaths Study (IPSDS), over the period 2015–2020. MH conditions were recorded on the basis of collateral information, including medical diagnosis or/and undiagnosed. The IPSDS cohort (n = 3625), comprising deaths given a coronial verdict of suicide and deaths on the balance of probabilities, was allocated to three mutually exclusive health groups: (a) no MH conditions, (b) one MH condition only, (c) two or more MH conditions ("MH multimorbidity"). Descriptive statistics ($p \leq 0.05$) and binary logistic regression analyses with odds ratios (OR) and 95% CIs ($p \leq 0.01$) are presented.

Results

One fifth (20%) of the IPSDS cohort had MH multimorbidity, which was more prevalent among those aged 35–44 years. The unadjusted logistic regression analysis indicated that those with multimorbidity were significantly more likely to have contacted health services before suicide, compared to those with no MH conditions. This finding was substantially unchanged following adjustment for sex, age, and labor market position (OR = 12.170, 95% CI 9.595–15.437, $p < .001$) and in a sensitivity analysis restricted to a subset of deaths given a coronial verdict of suicide (OR = 12.728, 95% CI 9.635–16.814).

Conclusions

Our findings suggest that those who experience MH multimorbidity and are in contact with health services should be targeted with tailor-made suicide prevention interventions.

KEYWORDS

Coroner; healthcare; Ireland; multimorbidity; suicide

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INTRODUCTION

"Multimorbidity" is defined as the simultaneous presence of two or more diseases, originally those

characterized by persistent or long-lasting duration ("chronic"), although more recent studies have used the term to describe multiple non-chronic ("acute") health conditions (Almirall & Fortin, 2013; van den Akker et al., 1998). Although the use of multimorbidity and comorbidity terms have been used interchangeably in previous research, the Medical Subject Headings (MeSH) term of multimorbidity introduced in 2018 has been helpful in differentiating between the two terms: comorbidity refers to diseases co-occurring with an index condition, while multimorbidity refers to co-occurring diseases where one condition is no more central than the (an)other(s) (Harrison et al., 2021; Tugwell & Knottnerus, 2019) While multimorbidity is often associated with old age, there is increasing evidence of significant multimorbidity in younger populations, when many chronic conditions (e.g., respiratory, endocrinological and mental) typically emerge (Ferro et al., 2019; Kuan et al., 2023).

The association between multiple physical or/and mental health conditions and suicidal behavior (fatal and non-fatal) has been extensively investigated, with the preponderance of evidence on suicide mortality as the primary outcome (Oude Voshaar et al., 2016; Pfeiffer et al., 2009; Qin et al., 2014; Sariaslan et al., 2022; Van Orden & Conwell, 2011; Webb et al., 2012; Zhang et al., 2019). More specifically, those with co-occurring mood and stress-related disorder and those with mood and substance use disorder dual diagnosis have an increased risk of suicide, compared to those with a single psychiatric diagnosis (Oude Voshaar et al., 2016; Pfeiffer et al., 2009; Zhang et al., 2019). Research has also shown that there may be a high suicide risk associated with physical health multimorbidity, with depression mediating the risk (Van Orden & Conwell, 2011; Webb et al., 2012). Further studies have indicated that the impact of physical illness on a person's life, in terms of disruption to daily activity, rather than the number of conditions, predicts suicide risk, especially at younger ages (Onyeka et al., 2020). Using data from Danish population registers to explore the co-occurrence of physical and psychiatric illnesses among people dying by suicide compared with living controls, Qin et al. (2014) found that the occurrence of physical and psychiatric illness within a 1–12-month period increased suicide risk. Furthermore, the risk of suicide was substantially increased even when psychiatric comorbidity developed some years (>10 years) after the onset of physical illness (Qin et al., 2014).

Previous studies have reported that the co-occurrence of depression and anxiety can increase the risk of suicide attempts and suicidal ideation (Beautrais et al., 1996; Quevedo et al., 2020). Moreover, a meta-analysis of longitudinal studies indicated that the combined effect of depression and anxiety is a stronger predictor of suicidal behavior among adolescents and young people than having either depression or anxiety (Gili et al., 2019). Other co-occurring mental health conditions associated with suicidal behavior include bipolar and personality disorder (Anona et al., 2024). A retrospective study conducted in England found that nearly half (44%) of individuals attending hospitals with a suicide attempt and a psychiatric diagnosis had a comorbid personality disorder (Haw et al., 2001).

Smith et al. (2023) reported that those with multiple physical conditions are at increased risk for suicide attempts and suicidal ideation due to social exclusion, functional limitation, perceived burdensomeness, and economic burden (Smith et al., 2023). Other studies have explored whether physical and psychiatric multimorbidity increases the risk of suicidal ideation and suicide (Kavalidou et al., 2017, 2019). The association between multimorbidity and suicidal thoughts and behaviors was explored among members of three Scottish age cohorts who were monitored over twenty years (Twenty-07 cohort study). Across the five waves of the study, cohort members with physical and mental multimorbidity were found to be at increased risk of suicidality (combined suicide attempt and suicidal ideation), compared to those not having any physical or mental multimorbidity (Kavalidou et al., 2019).

Previous research on use of healthcare services before suicide has indicated a large discrepancy in the contact rates between primary healthcare and mental health services. In a systematic review covering 44 studies published between 2000 and 2017, Stene-Larsen and Reneflot (2019) found that an average of 80% of suicide decedents had contact with primary healthcare in the year before suicide, and an average of 44% in the month before suicide. In contrast, the average for lifetime contact with mental healthcare was 57%, while nearly one-third (31%) had contact in the final year and 21% in the month before suicide (Stene-Larsen & Reneflot, 2019). Death and healthcare linkage studies further confirm that, in the year and month before suicide, the proportion of people contacting primary care is up to five times higher than those contacting mental health

services (Park et al., 2022). The latter finding, as the authors suggested, may be more common in countries where mental illness and suicidal behaviors are more highly stigmatized, as in Korea and non-Western countries.

AIM AND OBJECTIVES

Although healthcare services, especially primary care, are potentially vital intervention points before suicide, there is a lack of research on the contact with health services before suicide among those with multiple health conditions. The aim of the current study was to explore whether mental health (MH) multimorbidity is associated with a higher level of contact with healthcare services before suicide and to explore differences in the social and clinical characteristics and method of death between subgroups, defined by the number of MH conditions (none, one, or more than one).

METHODS

Study Design and Setting

This is a retrospective observational cohort study of probable suicide deaths. The data source is the Irish Probable Suicide Death Study (IPSDS) database, which comprises deaths given a coronial verdict of suicide and deaths likely (on the balance of probabilities) to have been caused by intentional self-harm (Cox et al., 2022). Data were anonymized and de-identified, in compliance with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

Participants and Data Source

The IPSDS cohort (n = 3625) was established via examination of closed coroners' files in all coroners' districts in Ireland, for deaths occurring between 2015 and 2020. Data relating to all sudden, unexpected, or traumatic deaths and deaths by suicide were collected by researchers from the Health Research Board (HRB) and considered for inclusion in the IPSDS dataset. This process replicated the methodology and logistics of the National Drug Related Deaths Index (NDRDI), an epidemiological database recording all drug and alcohol-related deaths in Ireland

(Lynn et al., 2009).

There were two sets of deaths in the IPSDS dataset: those with a coronial verdict of suicide or equivalent (such as “took own life,” “self-inflicted,” or “self-caused”), which, by definition, are considered to be suicide “beyond reasonable doubt”; and second, those considered, on the balance of probabilities, to be due to suicide using an adapted version of the Rosenberg criteria (Rosenberg et al., 1988), i.e., explicit and/or implicit evidence of intent to die, and/or deaths where multiple risk factors for suicide were present.

Ethical Approval

The IPSDS received ethical approval for the extension of coronial data collection through the NDRDI methodology from the Ethics Committee of the Irish College of General Practitioners in 2016.

Measures

Sociodemographic characteristics of the IPSDS cohort, as recorded in the coronial records, have been constructed as categorical variables (sex: male, female; relationship status: married/civil partnership/co-habiting, single, separated/divorced/widowed, unknown; and living situation: alone, family household, other shared accommodation e.g., friends, institution/halfway house/homeless, other (inc. prisons), unknown). Age has been recoded into 10-year age bands. Employment status was re-coded as “labor market status,” with the following three categories: “in the labor market” (comprising in paid employment and unemployed), “not in the labor market” (“student/training course,” “housewife/husband,” “retired/unable to work,” “other”), and “unknown.”

Method of death is a re-coded variable, with the following categories: “drowning,” “hanging,” “shooting,” “poisoning,” and “other” (fall, road traffic collision, railway incidents, stabbing, suffocation). The coding is based on ICD-10 (WHO, 1992) categories recorded in the coronial files.

Pre-death contact with any type of medical/health professional has been coded as “type of medical service,” with the following categories: “general practitioners,” “A&E,” “mental health services,”

“drug treatment,” “acute hospital or psychiatric in-patient,” “counselling,” “on call doctor,” “other,” or “was in contact with a service but type unknown.” A re-coded binary variable (Yes/No) of being in contact with any medical service is used in the following analyses. The dates or period of last contact with medical services is captured either in a day-month-year format or through a categorical variable listing the weeks or months since last contact was made (when exact date of last contact was not recorded in the coronial file). A computed categorical variable “within 1 year or more” was used in the analyses, with the categories of “within 1 year,” “1 year or more,” and “Unknown period since last contact” as options.

The IPSDS records collateral information on the history of a mental disorder, based on medical records or next of kin statements (family/friends). Given that information from next of kin is recorded whether the disorder has been medically assessed, self-reported, or undiagnosed, a broader term (“mental health condition”), that does not necessarily indicate the pathology of a diagnosed disorder, has been used. The presence, if any, of one or more mental health conditions is based on ICD-10 codes (ranging from F00–F09 to F99). History of prior self-harm, defined as an act with or without suicidal intent, and history of substance use have been recorded as categorical variables (“Yes,” “No,” “Unknown”).

Design and Analyses

Members of the IPSDS cohort have been allocated to three mutually exclusive groups: (a) those with no mental health conditions, (b) those with one mental health condition only, and (c) those with two or more mental health conditions (“MH multimorbidity”). Descriptive statistics and chi-square analysis were used for testing differences between the three health groups with regard to sociodemographic characteristics and method of death. The Mantel-Haenzsel test of linear association was used for analysis of age-related trends and presence/absence of MH multimorbidity, stratified by sex. To investigate the association between the number of MH conditions and contact with medical services before suicide, binary logistic regression models were run, with odds ratios (ORs) and 95% confidence intervals (Cis). The binary models were further adjusted for sex, age, and labor market position. The significance level for the chi square analyses

has been set at $p \leq 0.05$ and for the logistic regressions $p \leq 0.01$. Data analysis was performed with the Statistical Package for Social Sciences SPSS version 29 (SPSS Inc., Chicago, IL, USA) and Excel.

Sensitivity Analysis

The IPSDS includes both coroner- and researcher-determined suicides. A sensitivity analysis was conducted by repeating the binary regression analysis on the IPSDS sub-cohort with a suicide verdict given from coroners (beyond reasonable doubt), excluding researcher-determined suicides.

RESULTS

Overall, 74% (*n* = 2.698) of the IPSDS cohort were males, with the highest proportion of deaths in the age-band 35–44 (22%; *n* = 812) (see Table 1). Half of the cohort were single (51%) and over half 58% (*n* = 2.112) were living in the family household. A quarter (25%; *n* = 904) of the cohort was not in the labor market (*n* = 904), while over half (59%; *n* = 2155) were in the labor market (comprising those in paid employment and those who were unemployed and seeking work).

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TABLE 1. Sociodemographic and clinical characteristics and method of death in the IPSDS 2015–2020 cohort, by mental health condition group.

Characteristics[$]	No MH conditions *n* = 1245	One MH condition only *n* = 1667	MH multimorbidity *n* = 713	Total *n* = 3625	Sig level
Sex					
Female	200 (16%)	464 (28%)	263 (37%)	927 (26%)	$\chi^2 = 111.57$, df (2), $p < .001$
Male	1045 (84%)	1203 (72%)	450 (63%)	2698 (74%)	
Age group					
<24	228 (18%)	152 (9%)	80 (11%)	460 (13%)	$\chi^2 = 78.21$, df (10), $p < .001$

25–34	223 (18%)	257 (15%)	123 (17%)	603 (17%)	
35–44	258 (21%)	379 (23%)	175 (25%)	812 (22%)	
45–54	225 (18%)	408 (24%)	146 (20%)	779 (21%)	
55–64	163 (13%)	286 (17%)	117 (16%)	566 (16%)	
65+	148 (12%)	185 (11%)	72 (10%)	405 (11%)	
Relationship status					
Married/civil partnership/co-habiting	440 (35%)	624 (37%)	215 (30%)	1279 (35%)	$\chi^2 = 19.56$, df (6), $p = .003$
Single	652 (52%)	807 (48%)	385 (54%)	1844 (51%)	
Separated/divorced/widowed	112 (9%)	193 (12%)	89 (12%)	394 (11%)	
Unknown	41 (3%)	43 (3%)	24 (3%)	108 (3%)	
Living situation					
Alone	243 (19%)	446 (27%)	197 (28%)	886 (24%)	$\chi^2 = 44.26$, df (10), $p < .001$
Family household	749 (60%)	955 (57%)	408 (57%)	2112 (58%)	
Other shared accommodation e.g., friends	63 (5%)	53 (3%)	23 (3%)	139 (4%)	
Institution/halfway house/homeless	28 (2%)	39 (2%)	27 (4%)	94 (3%)	
Other (inc. prisons)	20 (2%)	28 (2%)	10 (1%)	58 (2%)	
Unknown	142 (11%)	146 (9%)	48 (7%)	336 (9%)	
Labor market status					
In the labor market	751 (60%)	1004 (60%)	400 (56%)	2155 (59%)	$\chi^2 = 12.69$, df (4), $p = .013$
Not in the labor market	282 (23%)	412 (25%)	210 (29%)	904 (25%)	
Unknown	212 (17%)	251 (15%)	103 (14%)	566 (16%)	
Prior self-harm					
Yes	90 (7%)	479 (29%)	286 (40%)	855 (24%)	$\chi^2 = 346.09$, df (4), $p < .001$
No	209 (17%)	126 (8%)	62 (9%)	397 (11%)	

Unknown	946 (76%)	1062 (64%)	365 (51%)	2373 (65%)	
History of substance use					
Yes	367 (30%)	569 (34%)	308 (43%)	1244 (34%)	$\chi^2 = 37.90$, df (2), $p < .001$
No	878 (70%)	1098 (66%)	405 (57%)	2381 (66%)	
Contact with medical services (n = 2012)					
Yes	350 (28%)	1069 (64%)	593 (83%)	2012 (56%)	$\chi^2 = 649.38$, df (2), $p < .001$*
General practitioner	216 (62%)	501 (47%)	244 (41%)	961 (48%)	
General hospital/ED/psychiatric in/outpatient	48 (14%)	248 (23%)	175 (29%)	471 (23%)	
Mental health professional (statutory or volunteer)	27 (8%)	191 (18%)	127 (21%)	345 (17%)	
Other and unknown service type	59 (17%)	129 (12%)	47 (8%)	235 (12%)	
No/unknown	895 (72%)	598 (36%)	120 (17%)	1613 (44%)	
Last contact with medical services (n = 2012)					
Within one year	156 (45%)	596 (56%)	454 (77%)	1206 (60%)	$\chi^2 = 121.87$, df (4), $p < .001$
One year and more	17 (5%)	22 (2%)	<10 (<1%)	40 (2%)	
Were in contact but date unknown	177 (51%)	451 (42%)	138 (23%)	766 (38%)	
Method of death					
Drowning	95 (8%)	218 (13%)	83 (12%)	396 (11%)	$\chi^2 = 122.74$, df (8), $p < .001$
Hanging	886 (71%)	1011 (61%)	410 (57%)	2307 (64%)	
Shooting	72 (6%)	43 (3%)	<10 (1%)%	123 (3%)	
Poisoning	96 (8%)	233 (14%)	113 (16%)	442 (12%)	
Other§	96 (8%)	162 (10%)	99 (14%)	357 (10%)	

[$] Raw number (*n*) and percentages (%) are presented for each variable. Percentages are rounded and may not add up to 100.

[%] Counts of fewer than 10 probable suicide deaths are not presented in tables or text and are instead replaced by <10.

[§] Other includes fall, road traffic collision, railway incidents, stabbing, suffocation, other.

[*] Significant level is based on the Yes/No categories.

A fifth (20%; *n* = 713) of the IPSDS cohort had two or more mental health conditions and nearly half (46%; *n* = 1667) had one MH condition only. The majority (77%; *n* = 551) of those with MH multimorbidity had two mental health conditions, 19% (*n* = 139) had three mental health conditions and 3% (*n* = 23) had four mental health conditions.

There was a statistically significant difference in the distribution of multimorbidity statuses by sex: compared to males, females were less likely to have no mental conditions (22 *vs.* 39% among males) and more likely to have MH multimorbidity (28 *vs.* 17% among males). MH multimorbidity was associated with age group, although not in linear fashion for either males or females (*p* = 0.950). The highest prevalence of MH multimorbidity was found among those aged 35–44 years (25%; *n* = 175). Under a third (30%; *n* = 215) of those with MH multimorbidity were married/in a civil partnership/co-habiting, compared to 35% (*n* = 440) of those with no MH condition and 37% (*n* = 624) of those with one MH condition (*p* = .003). Being homeless or living in homeless accommodation was more prevalent among the mental health multimorbidity group (4%; *n* = 27). The association between mental health condition group and labor market status was statistically significant (*p* = .013). Over a quarter (29%; *n* = 210) of those with MH multimorbidity were not in the labor market, compared to 25% (*n* = 412) with one mental health condition and 23% (*n* = 282) with no condition.

The prevalence of both prior self-harm and history of substance use was significantly different between the health groups, with a higher proportion of those with MH multimorbidity having a prior self-harm history (40%; *n* = 286) and substance use (43%; *n* = 308). Significant differences were found in the distribution of method of death between the MH condition groups. The prevalence of hanging was lower in both MH condition groups [one MH condition: 61% (*n* = 1011);

multimorbidity: 57% (*n* = 410)] than in the no MH condition group (71%; *n* = 886). Poisoning was more prevalent in the MH multimorbid group (16%; *n* = 113).

Slightly more than half (56%; *n* = 2012) of the IPSDS cohort was in contact with medical services before suicide. A significant higher proportion of those with MH multimorbidity were in contact with healthcare services (83%; *n* = 593) compared to those with one mental health condition (64%; *n* = 1069) and those with no mental health condition (28%; *n* = 350; *p* < .001). The most prevalent types of contact in the MH multimorbidity group were hospital-related services, such as A&E or psychiatric inpatient/outpatient (29%, *n* = 175) and mental health-related services (21%, *n* = 127); contact with GPs was more prevalent among those with no mental health conditions (62%, *n* = 216), than rest of health groups (one MH condition only: 47%, *n* = 501; MH multimorbidity: 41%, *n* = 244).

For 44% (*n* = 1613) of the IPSDS cohort information on their last contact with any healthcare professional was not recorded. Date of last contact with medical services was recorded for the deaths of 1246 members of the IPSDS cohort (62%), of whom 1206 (97%) had seen a medical professional within one year before their death. Significant differences were found between the health groups with regard to the timing of last contact with medical services: 77% (*n* = 454) of those with MH multimorbidity saw a healthcare professional within that past year, compared to 56% (*n* = 596) with one mental health condition and 45% (*n* = 156) with no mental health condition.

The unadjusted logistic regression analysis revealed that those with MH multimorbidity were significantly more likely to have contacted health services before suicide, compared to those with no mental health conditions and those with one mental health condition (Table 2). This finding remained unchanged following adjustment for sex, age, and labor market position (one MH condition: OR = 4.340, 95% CI 3.683–5.113; MH multimorbidity: OR = 12.170, 95% CI 9.595–15.437, *p* < .001).

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TABLE 2. Unadjusted and adjusted binomial regression analyses of the association between contact with medical services and mental health conditions among the IPSDS 2015–2020 cohort.

	OR	95% CI
No MH conditions (reference)	–	–
One MH condition only	4.571	3.899–5.359
MH multimorbidity	12.637	10.022–15.934
	Adjusted analyses[a]	
No MH conditions	–	–
One MH condition only	4.340	3.683–5.113
MH multimorbidity	12.170	9.595–15.437

[a]Adjusted for: sex, age group, and labor market position.

In consideration of the more inclusive and research-based approach to the identification of suicide deaths used in this study, compared to the more narrowly defined operational definition of suicide used in the coronial system, we conducted a sensitivity analysis which was restricted to deaths with a coronial suicide verdict. The results (Table 3) were almost identical to those based on the whole cohort (Table 2). After adjustment for sex, age, and labor market position, those with MH multimorbidity were more likely to contact healthcare professionals than those with one MH condition (one MH condition: OR = 4.420, 95% CI 3.656–5.345; MH multimorbidity: OR = 12.728, 95% CI 9.635–16.814, $p < .001$).

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TABLE 3. Sensitivity analysis: unadjusted and adjusted binomial regression analyses of the association between contact with medical services and mental health conditions among the 2015–2020 IPSDS cohort with a coronial suicide verdict.

	OR	95% CI
No MH conditions (reference)	–	–
One MH condition only	4.446	3.704–5.337
MH multimorbidity	12.041	9.202–15.755
	Adjusted analyses$	
No MH conditions	–	–
One MH condition only	4.420	3.656–5.345
MH multimorbidity	12.728	9.635–16.814
$Adjusted for: sex, age group, and labor market position.		

DISCUSSION

In this retrospective analysis of six years of national coronial data, people with multiple mental health conditions (MH multimorbidity) were significantly more likely to have contacted health services before suicide, compared to those with no mental health conditions. Almost half of the IPSDS cohort were in contact with general practice. However, those with multiple MH conditions were more likely to be in contact with hospital-related healthcare facilities and mental health professionals, compared to the rest of the health groups. This offers the potential for an effective intervention to prevent suicide. Although it cannot be assumed that suicidality was evident or articulated during interactions between patients and healthcare professionals before suicide, previous self-harm (medically treated or not) was recorded in the IPSDS for 40% of the MH multimorbidity group, which was significantly higher than in other health groups. Furthermore, substance use was significantly higher in the multimorbidity health group (43%), potentially indicating greater vulnerability to suicide risk in this population.

Although there is no previous literature on the association between health services utilization before suicide and the absence/presence of MH multimorbidity, our findings are consistent with evidence that almost half of the people who die by suicide are in contact with healthcare services the year before their death. A population-based register study in Sweden found that, in the year before suicide, people with a psychiatric diagnosis were more likely to contact primary care than those without a psychiatric diagnosis (Bondesson et al., 2022). There could be several

explanations for the lower contact with general practice among those with MH multimorbidity in our study, compared to the other health groups, such as the lack of physical/mental healthcare integration and neglect of the physical illness burden faced by people with MH symptoms, making them less likely to contact GPs for their physical illness comorbidities (Calder et al., 2022; Doherty & Gaughran, 2014; O'Connor et al., 2023). Acute and non-acute health services, e.g., primary care, have been studied in terms of self-harm presentations among people with multiple mental disorders, with Haw and colleagues reporting that 44% of self-harm patients attending a general hospital for self-harm treatment had multiple mental disorders (Haw et al., 2001).

Problematic polypharmacy, occurring when (potential) harms from medicines outweigh (potential) benefits, has been previously documented for people with multimorbidity (Forslund et al., 2021; Reeve et al., 2015**AQ2**, 2022), providing evidence that this patient population has a high mortality risk especially with increasing number of co-occurring health conditions. With English and Scottish guidance highlighting the need for personalized case for multimorbid patients with polypharmacy to reduce adverse drug events, mortality rates, and improve quality of life (NICE, 2016; Scottish Government Polypharmacy Model of Care Group, 2018), a recent systematic review concluded that polypharmacy-related interventions for high-risk populations are still lacking (Keller et al., 2024). Consistent with our findings indicating a significant proportion of those with MH multimorbidity dying by poisoning (including prescribed and/or over the counter medications, and illicit drugs), the method of suicide by personality disorder (PD) comorbidities was examined among a hospitalized PD cohort in Sweden (Björkenstam et al., 2016). The highest standardized mortality ratios (SMR) were found for both males and females on poisoning deaths with a PD and psychoactive substance use co-occurrence (females: SMR = 54.1, 95% CI, 43.6–67; males: SMR = 35.4, 95% CI, 29.8–41.9). International research further indicates that prescribed/non-prescribed medication and drug/alcohol use are highly prevalent among multimorbid patients (Forslund et al., 2021; Kabashi et al., 2021). Based on Irish evidence that the main substances used in two out of every three poisoning deaths are prescribed or/and over-the-counter medication and alcohol (Lynn, 2020), our findings underline the need for healthcare professionals to explore substance misuse and polypharmacy among patients with MH multimorbidity to minimize the risk of

subsequent intentional poisoning deaths.

The finding that multimorbidity was more prevalent among females in the IPSDS cohort reflects global evidence that more females than males experience the burden of multimorbid conditions (Chowdhury et al., 2023). The meta-analysis by Chowdhury and colleagues indicated that physical and mental illness multimorbidity is more prevalent among older populations, while MH multimorbidity is more prevalent in mid-age cohorts (Chowdhury et al., 2023; McLean et al., 2014). Our finding of a low prevalence of MH multimorbidity within the older age cohort is in line with Scottish evidence that MH multimorbidity is more common among those under 45 years of age (Kavalidou et al., 2019; McLean et al., 2014). Furthermore, not being in the labor market among those with one and more MH conditions in the IPSDS cohort in the working age group of 35–44 is consistent with previous research and highlights the association between health-related economic inactivity and premature mortality (Henderson et al., 2024; Knies & Kumari, 2022).

Strengths and Limitations

The main strength of this study is its access to the only available dataset in Ireland describing the sociodemographic and clinical characteristics of people who die by suicide according to the presence of multiple mental health conditions experienced before death. Additionally, our analysis breaks new ground by disaggregating the mental health group into two subgroups: those with one mental health condition and those with two or more mental health conditions. The findings of this study support the value of this approach, not least because of the demonstration of significantly higher prevalence of contact with medical services before death in the MH multimorbidity group compared to the group with only one MH condition. Our sensitivity analysis confirmed that the findings relating to the whole IPSDS cohort were not an artifact of the broader definition of suicide used in the IPSDS.

Several limitations should be acknowledged. First, “mental health multimorbidity,” as used in the current study, is a broad term that does not necessarily indicate multiple clinical diagnoses. Furthermore, no information was available on the onset of each health condition within the multimorbid group or the severity of the mental health condition. Although it has been argued in

psychiatric research that dual diagnosis (mental illness and co-occurring substance disorder) should be conceptualized as multimorbidity (Bhalla & Rosenheck, 2018), the IPSDS variable "history of substance use" does not necessarily indicate evidence of a disorder, and therefore was not included as a mental health condition. Second, area-level social determinants of health and deprivation are strongly associated with multimorbidity (Head et al., 2021; Knies & Kumari, 2022). However, no relevant information, such as income, deprivation index score, educational level, or ethnicity, were available in the IPSDS, and our work cannot provide further evidence relating to this association.

Third, it should be noted that coroners collect and record information that is considered germane to the purposes of the death investigation. When details of the decedent's history are unavailable for a specific variable, the value for that variable in the IPSDS database is recorded as "missing" (unknown). The range of missingness for the data analyzed in the current study were: sex (0%), age group (0%), method of death (0%), relationship status (3%), living situation (9%), labor market status (16%), history of mental health conditions (34%), last contact with health services (44%) and prior self-harm (76%). Given the level of missingness for the clinical variables, it is possible that prevalence may have been over- or under-estimated (depending on the "true" prevalence in the missing cases). It should be noted, however, that, even including "unknown" as a substantive value in the analysis, the association between MH multimorbidity and clinical variables shows the expected (linear) gradient and (positive) direction: the greater the number of mental health conditions (from none to multimorbidity), the higher the prevalence of prior self-harm, history of substance abuse and contact with medical services.

CONCLUSION

People with mental health conditions or disorders constitute a vulnerable patient group with a higher suicide risk, requiring targeted suicide prevention actions, mainly at the healthcare intervention point (WHO, 2018). Our investigation reveals that those with multiple mental health conditions (MH multimorbidity) are more likely to contact medical services within the year before suicide compared to those with one mental health condition only or no mental health condition at

all. Several risk factors were found to be more prevalent in the MH multimorbid group compared to having none or one mental health condition, including prior self-harm and history of substance use. Healthcare services should be aware of this pattern of risk and target patients with multiple mental health disorders and co-occurring substance use accordingly.

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ETHICAL APPROVAL

The study complied with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. The IPSDS received ethical approval for the extension of coronial data collection through the NDRDI methodology from the Ethics Committee of the Irish College of General Practitioners in 2016.

CONSENT TO PARTICIPATE AND PUBLICATION

Not applicable.

AUTHOR CONTRIBUTIONS

All authors have substantial contributions to conception, design, analysis, and interpretation of data, drafting the article, or revising it critically for important intellectual content. All authors have approved the final version before submission and agreed to be accountable for all aspects of the work and resolved any issues related to its accuracy or integrity. The corresponding author (KK) affirms that has access to all the data of the study and had freedom to direct the analysis and reporting without influence from the IPSDS funders.

DISCLOSURE STATEMENT

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article. KK and GC are employed by the National Office for Suicide Prevention (NOSP), HSE and are members of the Connecting for Life (CfL) Data & Intelligence Advisory Group (DIAG). AM was employed by the NOSP and was a member of the CfL DIAG until 2023. SP was chair of the CfL Expert Advisory Group, a member of the CfL DIAG, and a paid consultant to HSE NOSP until March 2024.

DATA AVAILABILITY STATEMENT

Anonymized data reported in this article will not be made available following publication. For more information on the IPSDS, contact should be made with info@nosp.i.e.

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