

Mental disorders and risk of suicide attempt in prisoners

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ABSTRACT

Background: Mental disorders are overrepresented in prisoners, placing them at an increased risk of suicide. Advancing our understanding of how different mental disorders relate to distinct stages of the suicidal process—the transition from ideation to action—would provide valuable information for clinical risk assessment in this high-risk population.

Methods: Data were drawn from a representative sample of 1212 adults (1093 men) incarcerated across 13 New Zealand prisons, accounting for 14% of the national prison population. Guided by an ideation-to-action framework, three mutually exclusive groups of participants were compared on the presence of mental disorders assessed by validated DSM-IV diagnostic criteria: prisoners without any suicidal history (controls; $n = 778$), prisoners who thought about suicide but never made a suicide attempt (ideators; $n = 187$), and prisoners who experienced suicidal ideation and acted on such thoughts (attempters; $n = 247$).

Results: One-third (34.6%) of participants reported a lifetime history of suicidal ideation, of whom 55.6% attempted suicide (19.2% of all prisoners). Suicidal outcomes in the absence of mental disorders were rare. Whilst each disorder increased the odds of suicidal ideation (OR range 1.73–4.13) and suicide attempt (OR range 1.82–4.05) in the total sample ($n = 1212$), only a select subset of disorders was associated with suicide attempt among those with suicidal ideation ($n = 434$). Drug dependence (OR = 1.65, 95% CI 1.10–2.48), alcohol dependence (OR = 1.89, 95% CI 1.26–2.85), and posttraumatic stress disorder (OR = 2.09, 95% CI 1.37–3.17) distinguished attempters from ideators.

Conclusion: Consistent with many epidemiological studies in the general population, our data suggest that most mental disorders are best conceptualized as risk factors for suicidal ideation rather than for suicide attempt. Once prisoners consider suicide, other biopsychosocial factors beyond the mere presence of mental disorders may account for the progression from thoughts to acts of suicide.

Keywords: Psychiatric morbidity, self-harm, suicidal thoughts, ideation-to-action, offenders

INTRODUCTION

Suicide is a global public health concern [1] occurring at higher rates in prisoners compared with non-incarcerated people in the community at large [2]. Like many other health outcomes, extant evidence suggests that suicide is rarely the result of a single cause or stressor, but rather depends on the cumulative and interactive effects of myriad biopsychosocial factors [3-7]. Notwithstanding this plethora of risk factors, the presence of a mental disorder is invariably considered one of the most robust and clinically relevant predictors of suicidal behaviour, in the general population [8-16] and in custodial settings alike [17-24]. In their guidelines, many renowned health-oriented and suicide-focused organizations indeed include mental disorders at the top of their lists of suicide risk factors [5]. Accordingly, the early identification and effective management of mental disorders has been widely advocated as a key approach in suicide prevention [25-28], inter alia, by the World Health Organization [29-31].

Although it is well-established that mental disorders are associated with increased risk of suicide, converging evidence highlights that most mental disorders (and many other oft-cited risk factors) actually predict *thoughts* of suicide (suicidal ideation) rather than suicidal *behaviour* among those contemplating suicide [32-34]. This thought–behaviour bifurcation is critical, as cross-national data suggest that out of the relatively high proportion of adults who consider suicide, the vast majority (71%) will *not* go on to attempt suicide in their lifetime [35]. Similarly, although suicidal ideation conferred an eight-fold increased risk of subsequent suicide attempt in a prospective population-based study, only 7% of those with baseline suicidal ideation attempted suicide two years later [36]. Therefore, identifying those at greatest risk of acting on their suicidal thoughts can help to improve risk assessment and identify potential targets for intervention in the early phases of the suicidal process—that is, before thoughts progress to acts of suicide. In light of this, large-scale epidemiological research has sought to identify which mental disorders predict suicide attempt beyond their association with suicidal ideation [37-51]. Collectively, results from these methodologically-sound studies generally indicate that, in the few instances where mental disorders

do predict the transition from ideation to action, these disorders are characterized by anxiety (e.g., posttraumatic stress disorder) and poor impulse control (e.g., substance use disorders). In support of such findings, a meta-analysis of 27 studies recently concluded that only anxiety disorders overall, and posttraumatic stress disorder in particular, as well as drug use disorders, conferred increased risk of suicide attempt among those with suicidal ideation, albeit effect sizes were only small to moderate [52].

In contrast to this accumulating number of studies in the general population, comparatively little is known regarding which mental disorders—and risk factors more generally—uniquely predict the progression from thoughts to acts of suicide among prisoners. Owing to their disproportionately high proportions of both mental disorders [53-56] and suicidal outcomes [21,57,58], community-based findings should not be generalized to this vulnerable population of incarcerated offenders, or in the very least with caution. To the best of our knowledge, however, only two studies previously investigated clinical factors that differentiate between prisoners who attempted suicide (attempters) and those who thought about suicide but never made an attempt (ideators). In a random sample of 996 adults incarcerated throughout 30 Australian prisons, moderate/severe depression conferred an increased risk of suicide attempt among those who reported suicidal ideation in bivariate analysis, but did not retain statistical significance once other covariates were controlled for [57]. More recently, Favril and O'Connor [58] documented that mental disorders and substance abuse independently distinguished attempters from ideators in a Belgian sample of 1326 prisoners. While yielding important insights, however, these few studies are limited in that they solely relied on a screening instrument for depressive symptomatology [57] or on self-reported diagnoses overall [58], rather than assessing a range of mental disorders through validated diagnostic measures. To date, we are not aware of a single published study examining how specific mental disorders differentially relate to distinct stages of the suicidal process—the transition from ideation to action—among prisoners. Yet, delineating mental disorders that may govern behavioural enactment among those considering suicide could guide risk assessment and enable clinicians to better target interventions,

especially in this high-risk population where many individuals experience thoughts about suicide [59]. Against this background, we sought to examine the extent to which specific mental disorders are associated with suicide attempt above and beyond their association with suicidal ideation in a nationally representative sample of prisoners.

METHODS

Participants and procedures

This paper reports on the 2015 *New Zealand Prisoner Mental Health Comorbidity Study* which was conducted between March and July 2015 across 13 prisons nationwide. A detailed discussion of the procedures and survey methods can be found in the main study report [60]. Briefly, all prisoners aged 18 years and over who were newly sentenced or in custody for less than three months were invited to participate. Eligible participants were identified by New Zealand Department of Corrections staff and were provided with a brief overview of the study. Those interested in participating were taken to an interview room where members of the National Research Bureau (NRB) informed participants about the study, obtained their signed consent forms, and conducted the face-to-face interviews using computer-assisted personal interviewing. Importantly, the survey was conducted by trained interviewers independent of the prison system (NRB) to ensure objectivity, and study procedures adhered to rigorous protocols to ensure participants' confidentiality and safety. Prisoners were excluded if they did not speak proficient English or if they were determined by correctional staff to be too mentally or physically unwell to participate safely. The average time to complete the interview was 105 minutes, with a median duration of 93 minutes.

Of the 1557 eligible men and women invited to participate in the study, 189 refused to participate and a further 156 were excluded because they did not complete the survey instruments. The final sample of 1212 prisoners (119 women) equates to a 77.8% response rate, which is similar to a 85% response found in related prison studies [57,58]. The study sample represents 13.8% of all New Zealand prisoners and was not found to be significantly different by age, sex, or ethnicity [60].

Specifically, the sex distribution of the study sample (90% men) reflects that of the national prisoner population (96% men) at the time of recruitment [61].

Measures

Background variables

We recorded five demographic characteristics of participants: sex, age (17–24, 25–44, and ≥45 years), ethnicity (European, Māori, and Pacific Islander or other), country of birth (New Zealand vs. other), marital status (married/de-facto vs. other), and education (secondary school qualification vs. none). Criminological variables included history of incarceration (any prior custody vs. none), custodial status (remand vs. sentenced), security classification (high vs. other), and offence type leading to the current period of imprisonment. This latter variable was recoded into violent (e.g., murder, manslaughter, and rape) vs. non-violent (e.g., drug offences, theft, and fraud) offences.

Mental disorders

The *Composite International Diagnostic Interview* (CIDI) 3.0 was used to assess the prevalence of mental disorders [62]. The CIDI is a fully structured and validated diagnostic interview that can be administered by trained lay interviewers, previously adopted in prison settings [63,64]. Diagnostic modules were completed for a range of anxiety disorders (generalised anxiety disorder [GAD], panic disorder, and posttraumatic stress disorder [PTSD]), mood disorders (bipolar disorder, dysthymia, and major depressive disorder [MDD]) and substance use disorders (alcohol dependence and drug dependence) which are reported on using DSM-IV diagnoses, as is most commonly used in New Zealand [63]. The survey did not utilise a diagnostic instrument for the assessment of psychotic disorders but used the CIDI questions related to whether a participant indicated that they ever had symptoms of psychosis, such as seeing visions and hearing voices. Personality disorders were assessed using the *Personality Diagnostic Questionnaire 4+* (PDQ-4) including the use of the clinical

significance scale to improve sensitivity and specificity in this prisoner population [65]. All mental disorders were assessed on a lifetime basis.

Suicidal ideation and attempt

Consistent with similar high-quality studies in prison [57,58] and the general population [66,67], our outcome measure was lifetime history of suicidal ideation and attempt. Suicidal ideation was assessed with the question “Have you ever seriously thought about committing suicide?” (coded as no/yes). Regardless of the answer to the question about suicidal ideation, respondents were also asked whether they ever attempted suicide (coded as no/yes). Both items were used to categorize participants in three mutually exclusive groups: those without any suicidal history (*controls*), those who had thought about suicide but never made a suicide attempt (*ideators*), and those who had experienced suicidal ideation and attempted suicide in the past (*attempters*). No participants were found to have attempted suicide without reporting suicidal ideation.

Statistical analysis

The final sample was weighted by sex, age, and ethnicity to be a representative sample of the New Zealand prison population as at May 2015. Contingency tables were used to describe characteristics of the total sample, further stratified by participants’ suicidal history. A series of logistic regressions were conducted to investigate the relationship of mental disorders with suicide-related outcomes. First, bivariate analyses examined the effects of each disorder separately on suicidal ideation (ideators and attempters vs. controls) and suicide attempt (attempters vs. controls and ideators) in the total sample. For subsequent analyses, the sample was restricted to the subgroup of prisoners who reported suicidal ideation (irrespective of whether they attempted suicide), thus excluding non-suicidal controls. The rationale behind this choice is that (virtually) all individuals who attempt suicide experience suicidal thoughts, and such a methodological design avoids the problem of accounting for the shared variance with suicidal ideation when examining risk factors for suicide attempt [33].

Specifically, we tested whether mental disorders were associated with suicide attempt among those with suicidal ideation (attempters vs. ideators). Both bivariate (i.e., considering only one disorder at a time) and multivariate (i.e., considering all disorders simultaneously) analyses were conducted. The latter (multivariate) analysis sought to identify independent associations between mental disorders and suicide attempt among those with suicidal ideation. We further report on subgroup analyses by participants' sex. Crude (OR) and adjusted (aOR) odds ratios, and their 95% confidence intervals (CI), are presented as estimates of the strength of associations, although ORs be overestimated when the prevalence of the outcome is common (>10%). All analyses were done in SAS (version 9.4), with p values < 0.05 considered as statistically significant.

RESULTS

Sample characteristics

A total of 1212 offenders incarcerated across 13 New Zealand prisons were included in the study. The characteristics of the sample are presented in Table 1, further stratified by their suicidal history (controls, ideators, and attempters). Overall, the majority of participants were men (94.2%) and born in New Zealand (85.6%). Their modal age was 25 years (range 17–85), with a mean of 32.6 years ($SD = 11.5$). Three quarters (75.2%) of prisoners were sentenced at the time of assessment, with 65.3% having a history of prior custody. Around one-third (30.7%) of participants was charged with, or convicted of, a violent offence, and one in five (18.6%) had a high security classification.

Prevalence estimates

The weighted lifetime prevalence of suicidal ideation and suicide attempt was 34.6% (95% CI 31.8–37.3) and 19.2% (95% CI 16.9–21.5), respectively. Whereas women were more likely than men to report a suicide attempt (28.3 vs. 18.7; OR = 1.72, 95% CI 1.13–2.63), no sex difference was observed with regard to suicidal ideation (42.8 vs. 34.0; OR = 1.45, 95% CI 0.98–2.14). Of the 1212 participants, 778 (64.2%) had no suicidal history (*controls*), 187 (15.4%) reported suicidal ideation only (*ideators*),

and 247 (20.4%) attempted suicide in their lifetime (*attempters*). All participants who had made a suicide attempt in the past also reported suicidal ideation. Inversely, more than half (55.6%, 95% CI 50.7–60.6) of those with suicidal ideation had also attempted suicide (66.1% of women and 54.8% of men; OR = 1.61, 95% CI 0.84–3.07).

Table 1. Background characteristics of participants by suicidal history.

	Total sample (n = 1212)	Suicidal history			χ^2
		Controls (n = 778)	Ideators (n = 187)	Attempters (n = 247)	
Sex (male)	1093 (94.2)	714 (94.9)	169 (94.5)	210 (91.4)	6.30*
Age group					4.05
17–24 years	320 (18.9)	214 (19.8)	38 (13.9)	68 (19.8)	
25–44 years	691 (55.7)	436 (54.8)	112 (57.6)	143 (57.2)	
45+ years	201 (25.4)	128 (25.4)	37 (28.4)	36 (23.0)	
Ethnicity					25.63*
European	431 (33.9)	241 (29.8)	85 (42.5)	105 (40.9)	
Maori	623 (49.1)	414 (49.5)	86 (47.4)	123 (49.0)	
Pacific/other	158 (17.0)	123 (20.7)	16 (10.1)	19 (10.1)	
Country of birth (New Zealand)	1058 (85.6)	674 (84.0)	163 (87.2)	221 (89.9)	5.28
Marital status (married)	606 (51.7)	392 (52.1)	97 (54.2)	117 (48.5)	1.35
Secondary school qualification	463 (38.1)	305 (39.4)	65 (34.3)	93 (36.6)	1.81
Any previous custody	778 (65.3)	487 (63.7)	128 (69.9)	163 (67.0)	2.72
Sentenced status	894 (75.2)	589 (76.9)	136 (74.9)	169 (69.3)	5.23
High security classification	222 (18.6)	146 (19.0)	38 (20.7)	38 (15.5)	2.00
Violent offence	384 (30.7)	245 (29.9)	56 (30.5)	83 (33.5)	1.02

Note. Data are presented as n (%). All percentages are presented weighted and bases unweighted.

* Significant at the 0.05 level.

Table 2. Clinical characteristics of participants by suicidal history.

	Total sample (n = 1212)	Suicidal history			χ^2
		Controls (n = 778)	Ideators (n = 187)	Attempters (n = 247)	
Anxiety disorders					
GAD	108 (8.7)	35 (4.6)	32 (16.5)	41 (16.5)	45.81*
Panic disorder	65 (5.6)	26 (3.5)	14 (8.1)	25 (10.9)	18.10*
PTSD	292 (23.9)	122 (15.5)	59 (30.3)	111 (47.5)	97.31*
<i>Any anxiety disorder</i>	372 (29.9)	158 (19.6)	79 (41.4)	135 (55.7)	116.83*
Mood disorders					
Bipolar disorder	146 (11.1)	70 (8.1)	32 (15.9)	44 (17.5)	20.57*
Dysthymia	60 (4.9)	20 (2.5)	15 (7.9)	25 (10.5)	25.64*
MDD	254 (20.6)	110 (14.2)	60 (32.5)	84 (33.2)	53.18*
<i>Any mood disorder</i>	403 (32.0)	181 (22.4)	93 (49.0)	129 (51.1)	89.01*
Substance use disorders					
Alcohol dependence	449 (36.3)	230 (29.1)	79 (41.1)	140 (56.9)	56.81*
Drug dependence	479 (37.4)	265 (31.5)	78 (41.6)	136 (54.0)	36.71*
<i>Any substance use disorder</i>	1058 (87.0)	662 (84.7)	172 (91.3)	224 (91.7)	9.68*
Other disorders					
Any personality disorder	376 (33.1)	207 (28.8)	65 (37.4)	104 (44.3)	18.27*
Psychosis symptoms	151 (12.6)	50 (6.9)	33 (18.8)	68 (27.0)	64.57*
Any mental disorder	1106 (90.7)	687 (87.7)	181 (96.1)	238 (96.5)	21.12*
Two or more disorders	794 (63.6)	438 (53.8)	146 (78.5)	210 (85.2)	91.01*

Note. Data are presented as n (%). All percentages are presented weighted and bases unweighted.
 GAD = generalised anxiety disorder; PTSD = posttraumatic stress disorder; MDD = major depressive disorder.
 * Significant at the 0.05 level.

Lifetime prevalence estimates of mental disorders range from a high of 37.4% for drug dependence to a low of 4.9% for dysthymia (Table 2). Proportions for any anxiety disorder (29.9%) and any mood disorder (32.0%) were comparable, each found in approximately three out of ten prisoners. Any substance use disorder was identified in 87% of the total sample. According to screening instruments, one-third (33.1%) of participants had a personality disorder, and 12.6% reported symptoms of psychosis. In all, nine out of ten (90.7%) participants met diagnostic criteria for at least one mental disorder in their lifetime, with 63.6% of the study sample having two or more mental disorders.

Bivariate and multivariate analyses

Virtually all (96.4%) participants reporting suicidal ideation met diagnostic criteria for at least one of the disorders assessed, with an identical proportion (96.4%) found among those who attempted suicide. Among prisoners without any lifetime mental disorder, only 3.6% reported suicidal ideation and 1.9% had made a suicide attempt.

The associations of individual mental disorders with suicidal ideation and attempt in the total sample ($n = 1212$) are presented in Table 3. Bivariate analyses indicate that every single disorder examined was significantly associated with increased odds of suicidal ideation (all $p < 0.001$), with ORs ranging from 1.73 (personality disorders) to 4.13 (GAD). A similar pattern of results was observed for suicide attempt as the outcome variable, with comparable effect sizes (all $p < 0.001$). The highest OR for attempted suicide was noted for PTSD (OR = 4.05), with the other disorder-specific ORs in the range of 1.82 (personality disorders) to 3.68 (psychosis). Taken together, bivariate ORs for the associations between individual disorders and suicide-related outcomes were all consistently elevated and significant in the total sample of prisoners. As a group, anxiety disorders showed the strongest associations with suicidal ideation (OR = 3.99) and attempt (OR = 4.03), followed by mood disorders (ORs 3.49 and 2.77) and substance use disorders (ORs 1.95 and 1.81). As a whole, the presence of at least one mental disorder conferred a three-fold increased odds of both

suicidal ideation (OR = 3.71) and suicide attempt (OR = 3.33), with slightly higher ORs (3.97 and 4.09 respectively) observed among prisoners having two or more disorders.

Although each mental disorder examined was associated with significantly increased odds of suicide attempt in the total sample ($n = 1212$), only three disorders were bivariately associated with suicide attempt when limiting analyses to prisoners with suicidal ideation ($n = 434$). As detailed in Table 3, drug dependence (OR = 1.65, 95% CI 1.10–2.48), alcohol dependence (OR = 1.89, 95% CI 1.26–2.85), and posttraumatic stress disorder (OR = 2.09, 95% CI 1.37–3.17) conferred a two-fold increase in the odds of suicide attempt among prisoners with suicidal ideation. These ORs represent individual-level associations between specific mental disorders and suicide attempt, without taking into account the possible overlap (comorbidity) of multiple disorders. Therefore, a multivariate regression analysis was further conducted to identify *independent* associations between all mental disorders and suicide attempt in the subsample of participants reporting suicidal ideation; the results of which are presented in Table 4.¹ Only PTSD (aOR = 1.17, 95% CI 1.03–1.32) and alcohol dependence (aOR = 1.12, 95% CI 1.00–1.26) were associated with increased odds of suicide attempt among those reporting suicidal ideation, independently of other disorders. Drug dependence (aOR = 1.05, 95% CI 0.94–1.19) was no longer significant after adjusting for the presence of other mental disorders.

In summary, while mental disorders were consistently associated with suicidal ideation, they had weak (or no) associations with the progression from ideation to attempt.

¹ None of the correlations exceeded 0.42 and none of the variance inflation factor (VIF) values were greater than 2, suggesting that multicollinearity was not an issue in the multivariate model.

Table 3. Bivariate associations between mental disorders and suicidal outcomes.

	In the total sample (n = 1212)		Suicide attempt among those with suicidal ideation (n = 434)
	Suicidal ideation ^a	Suicide attempt	
Anxiety disorders			
GAD	4.13 (2.66–6.43)*	2.70 (1.75–4.18)*	1.00 (0.59–1.71)
Panic disorder	2.91 (1.72–4.95)*	2.65 (1.53–4.58)*	1.38 (0.67–2.85)
PTSD	3.63 (2.71–4.85)*	4.05 (2.94–5.58)*	2.09 (1.37–3.17)*
<i>Any anxiety disorder</i>	3.99 (3.04–5.23)*	4.03 (2.97–5.48)*	1.78 (1.19–2.66)*
Mood disorders			
Bipolar disorder	2.28 (1.58–3.28)*	2.00 (1.34–2.99)*	1.12 (0.66–1.91)
Dysthymia	3.93 (2.19–7.06)*	3.17 (1.79–5.60)*	1.36 (0.67–2.80)
MDD	2.97 (2.20–4.02)*	2.32 (1.66–3.23)*	1.03 (0.67–1.58)
<i>Any mood disorder</i>	3.49 (2.68–4.55)*	2.77 (2.04–3.75)*	1.09 (0.73–1.63)
Substance use disorders			
Alcohol dependence	2.42 (1.87–3.13)*	2.88 (2.13–3.91)*	1.89 (1.26–2.85)*
Drug dependence	2.04 (1.58–2.63)*	2.33 (1.72–3.16)*	1.65 (1.10–2.48)*
<i>Any substance use disorder</i>	1.95 (1.27–3.00)*	1.81 (1.04–3.12)*	1.05 (0.50–2.20)
Other disorders			
Any personality disorder	1.73 (1.32–2.27)*	1.82 (1.33–2.48)*	1.33 (0.87–2.03)
Psychosis symptoms	4.12 (2.80–6.07)*	3.68 (2.51–5.39)*	1.60 (0.97–2.62)
Any mental disorder	3.71 (2.05–6.73)*	3.33 (1.56–7.09)*	1.11 (0.37–3.38)
Two or more disorders	3.97 (2.95–5.35)*	4.09 (2.75–6.06)*	1.58 (0.93–2.67)

Note. Data are presented as odds ratios (OR) and their 95% confidence intervals (CI).

GAD = generalised anxiety disorder; PTSD = posttraumatic stress disorder; MDD = major depressive disorder.

* Significant at the 0.05 level.

^a Irrespective of suicide attempt status.

Table 4. Multivariate model for suicide attempt among those with suicidal ideation ($n = 434$).

	B	SE	aOR (95% CI)
GAD	-0.046	0.078	0.96 (0.82–1.11)
Panic disorder	0.047	0.103	1.05 (0.86–1.28)
PTSD	0.155	0.064	1.17 (1.03–1.32)*
Bipolar disorder	0.324	0.328	1.38 (0.73–2.63)
Dysthymia	0.014	0.108	1.01 (0.82–1.25)
MDD	-0.049	0.071	0.95 (0.83–1.09)
Alcohol dependence	0.115	0.060	1.12 (1.00–1.26)*
Drug dependence	0.052	0.060	1.05 (0.94–1.19)
Any personality disorder	0.260	0.231	1.30 (0.82–2.04)
Psychosis symptoms	0.233	0.258	1.26 (0.75–2.14)

Note. aOR = adjusted odds ratios (adjusted for sex, age, ethnicity, and all other mental disorders in the model) and their 95% confidence intervals (CI).

GAD = generalised anxiety disorder; PTSD = posttraumatic stress disorder; MDD = major depressive disorder.

* Significant at the 0.05 level.

Analyses by sex

In the total sample of men ($n = 1093$), all mental disorders assessed were significantly associated with suicidal ideation (OR range 1.75–3.92) and suicide attempt (OR range 1.85–4.05). Among male prisoners with suicidal ideation ($n = 379$), only PTSD distinguished attempters from ideators, independently of other disorders. Different results were observed among incarcerated women. Only GAD (OR = 9.02), PTSD (OR = 4.06) and alcohol dependence (OR = 2.72) were associated with suicidal ideation in the total female sample ($n = 199$), whereas PTSD (OR = 3.63), MDD (OR = 2.79), alcohol dependence (OR = 2.42) and psychosis symptoms (OR = 14.15) were associated with suicide attempt. None of the disorders examined were significantly associated with suicide attempt among female prisoners with suicidal ideation ($n = 55$). We emphasize that the results for female prisoners should be interpreted cautiously given the small sample size and lack of statistical power.

DISCUSSION

To date, little is known regarding which mental disorders distinguish prisoners who attempt suicide from those who experience suicidal ideation but do not act on these thoughts. Yet, delineating diagnostic differences between ideators and attempters could shed light on clinical factors that contribute to the translation of suicidal thoughts into behaviour. We sought to address this empirical gap, and highlight four key findings from this study involving a representative national sample of more than a thousand New Zealand prisoners.

First, nine out of ten (91%) prisoners interviewed met diagnostic DSM-IV criteria for at least one mental disorder in their lifetime. Drug and alcohol dependence were the most prevalent disorders, each identified in one-third of participants (37% and 36% respectively), followed by PTSD and MDD with proportions around 20% in the study sample. Results further suggest that mental disorders rarely present in isolation; approximately two-thirds (64%) of participants experienced two or more mental disorders over the lifespan—albeit not necessarily concurrently. These figures are in keeping with those reported in other high-income countries [68-72], underscoring the established finding that mental disorders disproportionately affect the prison population worldwide [53]. Indeed, when compared with findings from a national epidemiological survey of the general New Zealand population [73] and a systematic review of the global prevalence of mental disorders [74], our findings indicate markedly elevated rates for mental disorders among incarcerated offenders.

Second, we estimate that one-third (35%) of prisoners in New Zealand experienced suicidal ideation in their lifetime, and one-fifth (19%) had ever attempted suicide. Prior large-scale studies identified highly similar prevalence estimates for suicidal ideation (34–44%) and suicide attempt (15–22%) among randomly sampled prisoners [21,22,57,58]. In reference to the general population, 16% and 5% of 12,992 participants included in the *New Zealand Mental Health Survey* [75] reported a lifetime history of suicidal ideation and attempt, respectively. Furthermore, among our study participants who reported suicidal ideation, more than half (56%) had also made a suicide attempt. This ratio of suicide attempts to suicidal ideation is comparable to the 58% and 47% respectively

identified among Australian [57] and Belgian [58] prisoners, but substantially higher than the 29% found among adults in the wider community [35]. The reason why prisoners appear to be proportionately more susceptible in making the transition from ideation to action is currently unclear and awaits further examination to inform tailored prevention efforts.

Third, we found that suicidal outcomes in the absence of mental disorders were rare [21]. Prisoners meeting diagnostic criteria for at least one mental disorder were more likely to report suicidal ideation and attempt than those with no such disorders. Specifically, every single mental disorder assessed was associated with significantly increased odds of suicidal ideation and attempt in the total sample, supporting the long-held notion that mental disorders are salient predictors of suicidal outcomes in prisoners [17-24]. Importantly, however, these associations were substantially attenuated—and became non-significant in most cases—when examining suicide attempt among prisoners with suicidal ideation. For example, dysthymia conferred a three-fold increased odds of suicide attempt in the total sample, but failed to distinguish attempters from ideators once the shared variance between suicide attempt and suicidal ideation was accounted for. These data suggest that few disorders are associated with suicide attempt above and beyond their association with suicidal ideation. While novel among prisoners, these findings mirror those from more than a dozen large-scale epidemiological studies in non-incarcerated populations [37-51] concluding that most mental disorders are important in the development of suicidal thoughts, but less relevant in predicting which individuals are at greatest risk of acting on these thoughts and progress to a suicide attempt.

Fourth, our results indicate that PTSD and substance use disorders most clearly differentiated between ideators and attempters. Once again, this finding concurs with an established body of literature, suggesting that disorders characterized by increased distress (anxiety) and decreased restraint (poor impulse control) are especially pertinent in predicting the transition from suicidal ideation to action [41-52]. In a similar vein, a recent Belgian study found that substance abuse independently distinguished attempters from ideators in a large prison sample [58]. Despite this

consistent pattern of findings across populations and settings, however, few empirical studies have yet sought to examine *why* these specific disorders may govern behavioural enactment among individuals considering suicide. With regard to substance use disorders, a plausible explanation is that the effects of alcohol and/or illicit drug use—either acute or because of long-term sequelae of use—may lower behavioural inhibition and impair decision-making [76,77], making it more likely that one will act upon their suicidal thoughts [67,78]. Such deficits in executive functioning have equally been reported in individuals diagnosed with PTSD [79]. Consistent with this assumption, a recent systematic review concluded that attempters are largely similar to ideators on a range of neurocognitive abilities, with the exception of two subdomains of executive functioning: inhibition and decision-making [80]. Pending replication in prison samples, such neurocognitive impairments could potentially explain why certain individuals who are thinking about suicide are propelled towards behavioural enactment, whereas others do not bridge this behavioural threshold [81].

Additionally, recent *ideation-to-action* theories of suicide [82-85] provide a conceptual framework to understand such differential effects of mental disorders on suicidal ideation vs. attempt. A common tenet shared by these models is an emphasis on the fact that suicidal ideation is only one component of risk and, on its own, is unlikely to result in suicidal behaviour. Although variously defined across theories, each of them posits that both a *desire* (suicidal ideation) and a *capability* for suicide are two necessary conditions in order for an individual to attempt suicide. Accordingly, disorders characterized by negative thinking (such as depression) may confer risk by increasing the desire for suicide, whereas those marked by impulsiveness and poor behavioural control (such as substance use disorders) may exacerbate risk by increasing one's capability of acting on suicidal thoughts [49,86]. This suicide capability—a necessary component for an individual to progress from ideation to action—is thought to be acquired in a myriad of ways, most notably through exposure to painful and provocative life events [87-89]. By definition, PTSD involves experiencing and reliving such traumatic and potentially life-threatening events, consequently increasing one's capability for suicide. This might explain the well-established finding that PTSD is

one of the few disorders to consistently predict suicide attempt among those with suicidal ideation [47-52]. Substance use disorders, on the other hand, could equally increase this capability by exposing users to painful and provocative events through proximal (intravenous administration, symptoms of withdrawal, overdose) and distal (engaging in risk-taking and impulsive behaviour while intoxicated) effects resulting from the use of psychoactive substances [86,90]. These explanations, however, remain largely hypothetical and in need of further empirical testing in prison samples. Sadly, a decade after Nock and colleagues [49] recommended that future research is warranted to delineate the mechanisms through which people come to think about suicide and subsequently progress from ideation to action, we can only conclude that this proposed line of research is still underdeveloped—yet vital—among this high-risk population of prisoners [58].

Strengths and limitations

To our knowledge, this paper represents the most comprehensive study in prisoners to date examining the extent to which different mental disorders are associated with suicide attempt beyond their association with suicidal ideation. A noteworthy strength of this study is its large and representative sample, accounting for 14% of the national prisoner population in New Zealand, all of whom were assessed using validated and reliable diagnostic instruments. Six methodological limitations should nonetheless be borne in mind when interpreting the study findings.

First, the cross-sectional nature of our study prohibits causal inferences and does not afford opportunities to verify the central assumption proposed—that mental disorders occurred temporally prior to suicidal outcomes. Since suicidal history and mental disorders were both assessed on a lifetime basis, the lack of precise temporal ordering may limit our interpretation of the nature of these associations. As such, a number of alternative interpretations cannot be ruled out, including the possibility that PTSD is a direct consequence of having attempted suicide [91] or that substance use reflects a maladaptive coping strategy which emerges after (rather than prior to) a suicide attempt. Second, as no collateral information could be obtained from third-party informants to

validate participants' reports, data were entirely based on retrospective self-report and thus may be subject to biased recall and social desirability [35,92]. Third, a single-item assessment for both suicidal ideation and attempt was used. Although commonly adopted in similar ideation-to-action studies in prisoner [57,58] and community-based [66,67] populations, such an approach is prone to misclassification [93]. In doing so, we were also unable to tap the intensity or severity of our study outcomes—both the suicide attempt and ideation-only group therefore reflect a heterogeneous composition of suicidal individuals. Future studies should assess characteristics of suicidal thinking (e.g., recency of ideation onset, frequency and uncontrollability of suicidal thoughts, severity of ideation at its worst point, and presence of a suicide plan) as these features have shown to facilitate the transition to suicide attempt [94,95]. Fourth, our data examined the presence of non-fatal suicidal outcomes, but not suicide. While suicide attempt history is a robust risk factor of suicide [19], some differences exist in risk factors for fatal and non-fatal suicidal behaviours [96]. Therefore, the current findings may not be generalizable to prisoners who have died by suicide. Fifth, we did not consider the severity or chronicity of each disorder examined, nor did we assess the full range of mental disorders. For example, studies in the general population have shown that obsessive-compulsive disorder [51] and impulse-control disorders (i.e., intermittent explosive disorder, conduct disorder, oppositional defiant disorder, and attention deficit hyperactivity disorder) are associated with suicide attempt among those with ideation [43-50]. These disorders were not included in the study protocol so we were unable to assess their potential relationship to suicidal outcomes. Sixth and finally, we were unable to examine differential associations between mental disorders and suicidal outcomes occurring before or during the current period of incarceration. Prospective studies are warranted to explore whether (and which) mental disorders are longitudinally associated with suicide attempt during the course of imprisonment.

Each of the aforementioned limitations restricts the inferences that can be drawn from this study and represents areas for improvement in future research among this understudied population of incarcerated offenders.

Conclusion and future directions

Even within the context of these methodological constraints, our results make a solid contribution to the nascent literature as it advances understanding of the differential associations between mental disorders and distinct stages of the suicidal process among prisoners. A central finding of this study is that the strong relationship observed between most investigated mental disorders and suicide attempt substantively diminished once suicidal ideation was taken into account. Pending replication, our results suggest that only a select subset of disorders—those characterized by anxiety and poor impulse control—may play a role in governing the translation of suicidal thoughts into behaviour.

Despite the fact that prisoners constitute a particularly vulnerable population when it comes to mental health [53-56], our data replicate and extend prior community-based findings showing that most mental disorders may actually predict suicidal ideation, but not the transition from ideation to action [37-51]. Moreover, in the few instances where mental disorders *did* distinguish attempters from ideators, effect sizes were soberingly small (OR range 1.65–2.09) but nonetheless consistent with recent meta-analytical evidence [52]. Taken together, this recurring pattern of findings across populations and settings suggests that most mental disorders may be important in the development of suicidal ideation, but once individuals consider suicide, other factors beyond the mere presence of mental disorders may account for the progression from thoughts to acts of suicide [32-34,82-85]. This is in keeping with the dominant discourse which emphasizes that suicidal behaviour is a multi-determined phenomenon, and a complex web of synergistically interacting factors is implicated in its aetiology [3-7]. Accordingly, in view of the clinical importance of being able to make predictions about the transition from suicidal ideation to action, further delineating volitional factors that facilitate behavioural enactment among prisoners who consider suicide represents a crucial avenue of future research in this understudied yet high-risk population.

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