

# A comparison of the clinical characteristics of women with recurrent major depression with and without suicidal symptomatology

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**Background.** The relationship between recurrent major depression (MD) in women and suicidality is complex. We investigated the extent to which patients who suffered with various forms of suicidal symptomatology can be distinguished from those subjects without such symptoms.

**Method.** We examined the clinical features of the worst episode in 1970 Han Chinese women with recurrent DSM-IV MD between the ages of 30 and 60 years from across China. Student's *t* tests, and logistic and multiple logistic regression models were used to determine the association between suicidality and other clinical features of MD.

**Results.** Suicidal symptomatology is significantly associated with a more severe form of MD, as indexed by both the number of episodes and number of MD symptoms. Patients reporting suicidal thoughts, plans or attempts experienced a significantly greater number of stressful life events. The depressive symptom most strongly associated with lifetime suicide attempt was feelings of worthlessness (odds ratio 4.25, 95% confidence interval 2.9–6.3). Excessive guilt, diminished concentration and impaired decision-making were also significantly associated with a suicide attempt.

**Conclusions.** This study contributes to the existing literature on risk factors for suicidal symptomatology in depressed women. Identifying specific depressive symptoms and co-morbid psychiatric disorders may help improve the clinical assessment of suicide risk in depressed patients. These findings could be helpful in identifying those who need more intense treatment strategies in order to prevent suicide.

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**Key words:** Co-morbidity, major depression, suicidal ideation, suicide, women.

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## Introduction

Clinical and epidemiological studies have consistently demonstrated a strong correlation between major depression (MD) and suicidality, here defined to include suicidal ideation, suicidal plan and suicide attempt (Sokero *et al.* 2003, 2005; Oquendo *et al.* 2004). A well-known meta-analysis and two nationwide studies from Scandinavia indicate that an in-patient with MD has about a 20-fold increased risk of completed suicide (Harris & Barraclough, 1997; Hoyer *et al.* 2000; Osby *et al.* 2001). The risk of a non-fatal suicide attempt among patients with MD is less precisely known, but is estimated to be about 40% after the first lifetime episode of MD (Malone *et al.* 1995) and the rate of repetition of attempt within 1 year is approximately 25% (Brådvik, 2003). Therefore, recognizing suicidal ideation and suicide attempts as important risk indicators is likely to improve sensitivity in predicting completed suicide.

Several studies have identified risk factors associated with suicidal ideation and attempts among psychiatric patients with MD. Depression severity (Roy, 1993), co-morbid personality disorder (Corbitt *et al.* 1996; Soloff *et al.* 2000), anxiety disorder (Stein *et al.* 2001; Sareen *et al.* 2005; Bolton *et al.* 2008b), panic attacks (Katz *et al.* 2011) and alcohol-use disorders (Bulik *et al.* 1990; Claassen *et al.* 2007) have all been associated with an elevated risk of suicide attempt in depressed patients. Another study found that anxious depression patients were characterized by significantly higher scores on the Scale for Suicide Ideation (Seo *et al.* 2011).

All of the major studies that compared patients suffering from MD disorder with and without suicidality have been carried out in European populations. It is not known to what extent these findings apply to patients in East Asia. The aim of this study is to investigate, for the first time to our knowledge, the differences in sociodemographic features, clinical features, psychiatric co-morbidity and depressive symptoms of patients with recurrent MD with and without suicidality in a large carefully examined group of Han Chinese female patients. Our major goal is to clarify in this population the degree to which MD with suicidality is quantitatively more severe than, or qualitatively distinct from, non-suicidal depression.

## Method

### Subjects

The data for the present study were drawn from the ongoing China, Oxford and VCU Experimental Research on Genetic Epidemiology (CONVERGE) study of MD. Analyses reported in this paper are

based on a total of 1970 cases recruited from 51 provincial mental health centers and psychiatric departments of general medical hospitals in 40 cities in 21 provinces. All cases were female and had four Han Chinese grandparents and were excluded if they had a pre-existing history of bipolar disorder, any type of psychosis or mental retardation. Cases were aged between 30 and 60 years, had two or more episodes of MD, with the first episode occurring between the age of 14 and 50 years and had not abused drugs or alcohol before the first episode of MD. The mean age of cases was 45.1 (s.d. = 8.8) years.

All subjects were interviewed using a computerized assessment system, which lasted on average 2 h for each case. All interviewers were trained by the CONVERGE team for a minimum of 1 week in the use of the interview. The interview includes assessment of psychopathology, demographic and personal characteristics, and psychosocial functioning. Subjects are asked if they are willing to have the interview recorded, for the purposes of quality control. About 80% of subjects gave consent. Trained editors listen to approximately 10% of these and provide feedback on the quality of the interviews. We ensure that consent for recording is informed by providing an information sheet and by training interviewers appropriately. The Ethical Review Board of Oxford University and ethics committees in participating hospitals in China approved all study protocols.

### Measures

The diagnoses of depressive (dysthymia and major depressive disorder) and anxiety disorders [generalized anxiety disorder (GAD), panic disorder with or without agoraphobia] were established with the Composite International Diagnostic Interview (WHO, 1997 lifetime version 2.1; Chinese version), which classifies diagnoses according to Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV) criteria (APA, 1994).

The assessment of suicidal features consisted of four questions all asked for the time when the participant had her lifetime worst depressive episode. The first inquired about preoccupation with death with the phrase 'think a lot about death'. Responses to this question were not analysed here. The second asked about 'thought a lot about committing suicide'. A positive response to this item here was considered evidence for suicidal ideation. The next item inquired about making a 'plan as to how you might do it'. A positive response here was considered evidence for a suicidal plan. If the participant responded negative to this item, the questioning then skipped to melancholic

symptoms. If the participant responded that she had a suicidal plan, she was then asked 'did you attempt suicide?' A positive response was treated here as 'suicide attempt'.

The interview was originally translated into Mandarin by a team of psychiatrists in Shanghai Mental Health Center with the translation reviewed and modified by members of the CONVERGE team. Phobias, divided into five subtypes (animal, situational, social and blood-injury, and agoraphobia), were diagnosed using an adaptation of DSM-III criteria requiring one or more unreasonable fears, including fears of different animals, social phobia and agoraphobia that objectively interfered with the respondent's life. The section on the assessment of phobias was translated by the CONVERGE team from the interview used in the Virginia Adult Twin Study of Psychiatric and Substance Use Disorders (VATSPUD; Kendler & Prescott, 2006).

Additional information was obtained using instruments employed from VATSPUD, translated and reviewed for accuracy by members of the CONVERGE team. Information on postnatal depression was assessed using an adaptation of the Edinburgh Scale (Cox *et al.* 1987). The stressful life events section, also developed for the VATSPUD study, assessed 16 traumatic lifetime events and the age at their occurrence (death of a family member, divorce/relationship breakup, ever unemployed, job loss, financial crisis, legal problems, serious illness, life-threatening accident, natural disaster, witness someone injured, raped, physically assaulted, physically abused, seriously neglected, threatened, and other terrible event (Kendler *et al.* 1998). The childhood sexual abuse questionnaire was a shortened version of the detailed module used in the VATSPUD study, which was in turn based on the instrument developed by Martin *et al.* (1993). Neuroticism was measured with the 23-item Eysenck Personality Questionnaire (Eysenck & Eysenck, 1975), which was also an established instrument for measuring neuroticism.

The case interview was fully computerized into a bilingual system of Mandarin and English developed in house in Oxford, and called SysQ. Skip patterns were built into SysQ. Interviews were administered by trained interviewers and entered offline in real time onto SysQ, which was installed in the laptops. Once an interview was completed, a backup file containing all the previously entered interview data could be generated with database-compatible format. The backup file, together with an audio recording of the entire interview, was uploaded to a designated server currently maintained in Beijing by a service provider. All the uploaded files on the Beijing server were then transferred to a server at Oxford on a quarterly basis.

### Statistical analysis

Sociodemographic and clinical characteristics of the sample were analysed. For continuous variables, independent Student's *t* tests were performed and, for categorical variables, Pearson's  $\chi^2$  were calculated. All the characteristics of individuals with suicidality *v.* non-suicidality MD were assessed by logistic regression in MD, with suicidality as the dependent variable (0 = absence and 1 = presence). Associations between variables were expressed as odds ratios and 95% confidence intervals. SPSS 13.0 for Windows (SPSS Inc., USA) was used in data analysis. Continuous measures such as neuroticism were standardized prior to analysis so that odds ratios reflect the change in the dependent variable per s.d. change in the predictor variable. All tests were two-tailed and significance level was defined as 0.05.

Two different approaches might be used for the comparison group for our cases with various levels of severity of suicidal symptomatology. One approach would be to only use the MD cases with no suicidal symptoms of any sort. This would maximize the observed differences. The alternative approach would be to utilize all depressive cases that did not report the severity of the suicidal symptoms being examined. Thus, when examining cases with suicide attempt, the latter approach would include in the comparison group patients with suicidal ideation or plans but not attempts while the former approach would eliminate them. In these analyses, we adopted the latter more conservative approach.

## Results

### Sociodemographic factors

We obtained information about suicidal symptoms and acts during the target episode – the one the respondent identified as being their worst. During their lifetime worst depressive episode, 61.8% ( $n=1196$ ) of our cases reported suicidal ideation, 42.9% ( $n=830$ ) reported a suicidal plan ( $n=830$ ) and 21.9% ( $n=423$ ) reported a suicide attempt. Data on sociodemographic characteristics of our cases with and without ideation, plan or attempts are shown in Table 1. As can be seen in Table 1, the female MD patients without any suicidality (no suicidal ideation, suicidal plan or attempt suicide) were significantly more likely to be married and employed. Patients with suicidal ideation had received significantly less education.

### Assessment of clinical features

Table 2 shows the odds ratios from the logistic regression analyses for the association between clinical

**Table 1.** Relationship between sociodemographic features of major depression and suicidality<sup>a</sup>

|                                | Suicidal ideation,<br>n (%) | <i>p</i> | Suicidal plan,<br>n (%) | <i>p</i> | Attempted suicide,<br>n (%) | <i>p</i> |
|--------------------------------|-----------------------------|----------|-------------------------|----------|-----------------------------|----------|
| Marital status                 |                             | 0.02     |                         | 0.002    |                             | 0.001    |
| Married                        | 612 (83.3)                  |          | 676 (81.4)              |          | 332 (78.5)                  |          |
| Never married                  | 27 (3.7)                    |          | 15 (1.8)                |          | 10 (2.4)                    |          |
| Separated/divorced/widowed     | 96 (13.1)                   |          | 139 (16.7)              |          | 81 (19.1)                   |          |
| Education                      |                             | 0.001    |                         | 0.26     |                             | 0.86     |
| Primary school                 | 272 (22.9)                  |          | 180 (21.8)              |          | 88 (21.1)                   |          |
| Middle school/technical school | 662 (55.6)                  |          | 462 (56)                |          | 235 (56.2)                  |          |
| College/graduate               | 256 (21.5)                  |          | 183 (22.2)              |          | 95 (22.7)                   |          |
| Occupation                     |                             | 0.002    |                         | 0.004    |                             | 0.001    |
| Employed                       | 345 (29.0)                  |          | 231 (28.0)              |          | 112 (26.8)                  |          |
| Unemployed                     | 580 (48.7)                  |          | 412 (49.9)              |          | 209 (50.0)                  |          |
| Retired                        | 265 (22.3)                  |          | 182 (22.1)              |          | 97 (23.2)                   |          |

<sup>a</sup> Results of  $\chi^2$  tests for differences in marital status, level of education achieved, and occupational status between those with and without suicidal symptomatology.

**Table 2.** Relationship between clinical features of MD and suicidality

|                           | Ideation ( <i>n</i> = 1196) |              |          | Attempt ( <i>n</i> = 423) |             |          | Plan ( <i>n</i> = 830) |             |          |
|---------------------------|-----------------------------|--------------|----------|---------------------------|-------------|----------|------------------------|-------------|----------|
|                           | OR                          | (95% CI)     | <i>p</i> | OR                        | (95% CI)    | <i>p</i> | OR                     | (95% CI)    | <i>p</i> |
| Number of episodes        | 1.00                        | (0.99–1.01)  | n.s.     | 1.01                      | (1.00–1.01) | 0.01     | 1.01                   | (1.00–1.02) | 0.002    |
| Number of MD symptoms     | 9.49                        | (7.10–12.68) | 0.001    | 3.11                      | (2.20–4.42) | 0.001    | 4.97                   | (3.71–6.65) | 0.001    |
| Length of longest episode | 1.00                        | (1.00–1.00)  | n.s.     | 1.00                      | (0.99–1.00) | n.s.     | 0.99                   | (0.99–1.00) | n.s.     |
| Neuroticism               | 1.03                        | (1.01–1.06)  | 0.02     | 0.99                      | (0.96–1.02) | n.s.     | 1.01                   | (0.98–1.03) | n.s.     |
| Family history of MD      | 0.29                        | (0.13–0.67)  | 0.01     | 0.53                      | (0.22–1.27) | n.s.     | 0.56                   | (0.26–1.19) | n.s.     |
| SLEs                      | 1.11                        | (1.01–1.23)  | 0.04     | 1.25                      | (1.14–1.36) | 0.001    | 1.25                   | (1.15–1.36) | 0.001    |
| Melancholia               | 1.04                        | (0.92–1.18)  | n.s.     | 1.08                      | (0.95–1.22) | n.s.     | 1.10                   | (0.99–1.23) | n.s.     |
| Postnatal depression      | 1.05                        | (0.71–1.55)  | n.s.     | 0.99                      | (0.68–1.44) | n.s.     | 1.11                   | (0.80–1.56) | n.s.     |
| Childhood sexual abuse    | 0.77                        | (0.44–1.35)  | n.s.     | 1.49                      | (0.89–2.51) | n.s.     | 1.30                   | (0.79–2.16) | n.s.     |
| PMS                       | 0.99                        | (0.93–1.04)  | n.s.     | 0.99                      | (0.94–1.04) | n.s.     | 1.01                   | (0.96–1.05) | n.s.     |

MD, Major depression; OR, odds ratio; CI, confidence interval; n.s., non-significant; SLEs, stressful life events; PMS, premenstrual syndrome.

features of MD and suicidality (assessed during the target episode). Patients who reported a suicide attempt or a suicidal plan had significantly more depressive episodes and MD symptoms, and significantly greater number of stressful life events. Patients with suicidal ideation also had a significantly greater number of depressive symptoms and had experienced significantly more stressful life events and also were less likely to have one or more first-degree family members with a history of MD.

#### Assessment of psychiatric co-morbidity

Diagnoses of dysthymia, panic disorder, agoraphobia and animal phobia were not associated with

any suicidality subtype. However, cases of MD with suicidal ideation and a suicidal plan had significantly higher rates of co-morbidity with GAD, social phobia and situational phobia. We also found significantly higher rates of GAD and lower rates of blood phobia in patients with a suicide attempt (Table 3).

#### Depressive symptoms and suicide attempts

The associations between specific depressive symptoms and a reported suicide attempt are shown in Table 4. Interestingly, loss of interest, one of the core diagnostic criteria for MD, was not associated with suicide attempt. The presence of decreased appetite

**Table 3.** Suicidality as a predictor of major depression with co-morbid diseases

|                    | n (%)      | Ideation |             |       | n (%)      | Plan |             |       | n (%)      | Attempt |             |       |
|--------------------|------------|----------|-------------|-------|------------|------|-------------|-------|------------|---------|-------------|-------|
|                    |            | OR       | (95% CI)    | p     |            | OR   | (95% CI)    | p     |            | OR      | (95% CI)    | p     |
| Dysthymia          | 228 (19.2) | 1.08     | (0.84–1.40) | n.s.  | 168 (20.3) | 1.15 | (0.90–1.47) | n.s.  | 91 (21.6)  | 1.26    | (0.95–1.68) | n.s.  |
| GAD                | 410 (34.7) | 1.82     | (1.46–2.26) | 0.001 | 292 (35.7) | 1.54 | (1.26–1.89) | 0.001 | 153 (37.0) | 1.50    | (1.18–1.91) | 0.001 |
| Panic disorder     | 127 (10.8) | 1.05     | (0.75–1.48) | n.s.  | 91 (11.1)  | 0.98 | (0.71–1.36) | n.s.  | 37 (8.9)   | 0.74    | (0.49–1.10) | n.s.  |
| Social phobia      | 191 (16.5) | 1.45     | (1.05–1.99) | 0.02  | 147 (18.3) | 1.43 | (1.07–1.92) | 0.02  | 69 (17.0)  | 1.17    | (0.83–1.64) | n.s.  |
| Agoraphobia        | 185 (15.9) | 0.89     | (0.65–1.23) | n.s.  | 144 (18.0) | 1.11 | (0.82–1.50) | n.s.  | 72 (17.7)  | 1.20    | (0.85–1.70) | n.s.  |
| Animal phobia      | 350 (30.1) | 1.12     | (0.88–1.43) | n.s.  | 258 (32.2) | 1.13 | (0.90–1.43) | n.s.  | 128 (31.4) | 1.13    | (0.86–1.48) | n.s.  |
| Situational phobia | 260 (22.4) | 1.35     | (1.02–1.79) | 0.04  | 198 (24.7) | 1.39 | (1.06–1.81) | 0.02  | 95 (23.3)  | 1.25    | (0.91–1.70) | n.s.  |
| Blood phobia       | 252 (21.7) | 0.78     | (0.60–1.01) | 0.06  | 182 (22.7) | 0.84 | (0.65–1.08) | n.s.  | 78 (19.2)  | 0.65    | (0.48–0.89) | 0.007 |

OR, Odds ratio; CI, confidence interval; n.s., non-significant; GAD, generalized anxiety disorder.

and weight loss, conversely, were correlated with a suicide attempt even after simultaneously adjusting for all depressive symptoms. The depressive symptom most strongly associated with suicide attempt in women was feeling worthless. Excessive guilt, diminished concentration and impaired decision-making were significantly associated with suicide attempt. A significant positive association was seen between psychomotor retardation and suicide attempt during their worst depressive episode.

## Discussion

To our knowledge, this is the first study of suicidal symptomatology in Chinese women with MD. Our results support the view that patients with suicidal symptomatology have a more severe form of MD, as indexed by both the number of episodes and number of MD symptoms, than those without such symptoms. This finding is supported by some studies (Bulik *et al.* 1990; Roy, 1993; Sokero *et al.* 2003; Oquendo *et al.* 2004) but not by all, including one study that suggests that depressed patients who attempt suicide have a vulnerability to suicidal behavior independent of the severity of their depressive illness (Malone *et al.* 1995). Indeed, one large-scale twin study has suggested that genetic risk factors for suicidality exist that are independent of risk for any psychiatric disorders (Statham *et al.* 1998).

Some of these discrepancies may be attributable to differences in the characteristics of the patients included in the studies or differences between a cross-sectional design and prospective design. The presence of stressful life events, especially childhood sexual abuse, has been associated with risk for a suicidal plan and suicide attempt in female MD samples (Roy, 2004; Bedi *et al.* 2011). The current study

suggests that in addition to serving as a marker for imminent suicidal acts, as reflected in the clinical practice of hospitalizing or increasing the frequency of monitoring of patients with previous suicide attempt, the presence of childhood sexual abuse indicates longer-term risk as well.

We found some systematic differences in the symptoms among women who have *versus* those who have not attempted suicide. People with decreased appetite, increased appetite and weight loss may be more at risk for suicide attempts. Psychomotor retardation and psychomotor agitation are associated with an elevated risk of suicide attempt. The strongest relationship was with feelings of worthlessness, with an approximately 4-fold increase in individuals with a history of suicide attempts. This is a consistent finding and highlights the importance of feelings of worthlessness in risk assessment (Bolton *et al.* 2008a), especially given their association with completed suicide (McGirr *et al.* 2007). Other symptoms associated with a history of suicide attempts included excessive guilt, diminished concentration and impaired decision-making. Further studies examining the associations between specific depressive symptoms and suicidal behavior, or other related outcome measures, may help to identify clinically important depressive subgroups among the heterogeneous group that exists currently.

Markedly higher levels of overall psychopathology characterize suicide attempters, as indicated by a more severe depression and a higher prevalence of co-morbid disorders. Psychiatric out-patients with major depressive disorder have a high level of co-morbidity with general anxiety disorder (Seo *et al.* 2011), social phobia, situational phobia, all of which independently implicate elevated risk for suicidal ideation and suicidal plan. This finding corroborates

**Table 4.** Depressive symptoms among women with major depressive disorder and suicide attempt

| Depressive symptom               | Non-suicide attempt, <i>n</i> (%) | Suicide attempt, <i>n</i> (%) | Adjusted odds ratio (95% CI) |
|----------------------------------|-----------------------------------|-------------------------------|------------------------------|
| Depressed mood                   | 1494 (99.1)                       | 423 (100)                     | 1.28 (1.25–1.31)*            |
| Lost interest                    | 1472 (92.7)                       | 419 (99.1)                    | 2.56 (0.91–7.24)             |
| Excessive fatigue                | 140 (92.7)                        | 396 (93.6)                    | 1.13 (0.80–1.60)             |
| Decreased appetite               | 1239 (81.8)                       | 369 (87.2)                    | 1.39 (1.07–1.80)**           |
| Weight loss                      | 868 (57.4)                        | 278 (65.7)                    | 1.32 (1.10–1.58)**           |
| Increased appetite               | 127 (8.4)                         | 52 (12.3)                     | 1.38 (1.08–1.76)*            |
| Weight gain                      | 102 (6.7)                         | 40 (9.5)                      | 1.32 (1.00–1.74)             |
| Insomnia/early morning awakening | 1394 (92.2)                       | 393 (92.9)                    | 1.09 (0.78–1.51)             |
| Hypersomnia                      | 203 (13.4)                        | 48 (11.3)                     | 0.86 (0.66–1.13)             |
| Psychomotor retardation          | 1101 (72.8)                       | 333 (78.7)                    | 1.29 (1.05–1.59)**           |
| Psychomotor agitation            | 1076 (71.2)                       | 324 (76.6)                    | 1.25 (1.02–1.53)*            |
| Feeling of worthlessness         | 1142 (75.5)                       | 399 (94.3)                    | 4.25 (2.86–6.32)**           |
| Excessive guilt                  | 1041 (68.8)                       | 347 (82.0)                    | 1.80 (1.43–2.26)**           |
| Diminished concentration         | 1350 (89.3)                       | 392 (92.7)                    | 1.40 (1.00–1.96)*            |
| Impaired decision-making         | 1202 (79.5)                       | 373 (88.2)                    | 1.71 (1.30–2.24)**           |

CI, Confidence interval.

\*  $p < 0.05$ , \*\*  $p < 0.01$ .

previous studies demonstrating a heightened risk of suicide attempt when social phobia and general anxiety disorder are co-morbid with MD (Stein *et al.* 2001; Sareen *et al.* 2005; Boden *et al.* 2007; Bolton *et al.* 2008*b*).

Our results indicate that co-morbid panic disorder is not associated with previous suicide attempts. Placidi *et al.* (2000) found similar results in a sample of in-patients. However, other studies have yielded contradictory results (Diaconu & Turecki, 2007; Bolton *et al.* 2008*a*, 2010; Brown *et al.* 2010) and one study found panic disorder to be protective against more lethal suicide attempts (Nakagawa *et al.* 2009). Further studies focusing on the relationship between panic disorder and suicide attempt are necessary to more clearly determine the nature of what seems to be a complex association.

Several limitations of this study should be considered. The first pertains to the assessment of suicidal behavior. We were unable to assess the severity or intended lethality of suicide attempts, and could not address indirect severity markers such as health service contacts related to suicide attempts. Highly lethal suicide attempts may differentiate individuals that are closer in profile to suicide completers than their counterparts who choose less lethal means (Linehan, 1986; Mann, 2002). Second, data were collected retrospectively from structured interviews and recall bias will have affected the results. Third, our patients were identified through hospitals; we did not include

depressed people living in the community. Our findings may not generalize to Han Chinese males, or Chinese females who do not seek treatment. Other limitations include not interviewing directly other family members and not assessing the inter-rater reliability of the interview.

In summary, Chinese women with suicidal symptomatology have some distinct symptom patterns, a more severe form of MD, higher co-morbidity rates and a stronger family history of MD. Our findings parallel those reported in the West and add to the literature indicating that the features of MD in China are similar to those reported elsewhere in the world. The findings from this study along with its methodological advantages will probably contribute to the ongoing development of suicide prevention strategies. Future large-scale prospective studies including completed suicide as an outcome are necessary to enhance the predictive ability of risk factors in this challenging area of investigation.

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### Declaration of Interest

None.

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