

## Research: Educational and Psychological Issues

# Does kindness matter? Self-compassion buffers the negative impact of diabetes-distress on HbA<sub>1c</sub>

A. M. Friis, M. H. Johnson, R. G. Cutfield and N. S. Consedine

Department of Psychological Medicine, University of Auckland, Auckland, New Zealand

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### Abstract

**Background** Higher self-compassion is associated with mental and physical health benefits in both healthy and chronically ill populations. The current study investigated the role of self-compassion in predicting depression, diabetes-specific distress and HbA<sub>1c</sub> in patients with diabetes.

**Aims** To assess the specific operationalization of negative emotionality that best predicted HbA<sub>1c</sub> and to test whether self-compassion would buffer HbA<sub>1c</sub> in patients with diabetes against the negative effects of distress.

**Methods** Patients with diabetes ( $n = 110$ ) completed measures assessing trait self-compassion, depression and diabetes-distress. HbA<sub>1c</sub> results were obtained through medical records.

**Results** As expected, diabetes-specific distress was a better predictor of HbA<sub>1c</sub> than depression; self-compassion moderated the relationship between distress and HbA<sub>1c</sub> such that higher distress predicted higher HbA<sub>1c</sub> at lower levels of self-compassion, but not at higher levels of self-compassion.

**Conclusions** In addition to further demonstrating the link between distress and metabolic outcomes, these findings suggest that self-compassion might buffer patients from the negative metabolic consequences of diabetes-distress.

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### Introduction

The link between diabetes and depression is well established, with diabetes thought to at least double the likelihood of a comorbid, unipolar depressive disorder [1]. Not only does depression make living with diabetes more difficult, it also predicts increased microvascular complications and heart disease [2], possibly as a consequence of poorer glycaemic control [3]. Research into the treatment of depression in patients with diabetes suggests mixed outcomes, with moderate effects for treatment overall [4], but no consistent flow-effect in terms of improved HbA<sub>1c</sub> [5]. A meta-analysis showed no overall effect of treatment with either cognitive behavioural therapy or antidepressant medications on metabolic management among adults [6], but a more recent study [7] and review [4] found that improvements in depression were linked to improved glycaemic control.

Although research has focused on the relationship of depression to HbA<sub>1c</sub>, the effects of other, subclinical forms of emotional distress on diabetes outcomes are less well understood [4,8,9]. A few recent studies have suggested that

it is the distress and negative mood resulting from the burden of managing one's diabetes that is more strongly related to glycaemic control rather than depression per se [10]. Other work shows that diabetes-specific emotional distress mediates the association between depression and glycaemic control [11], a finding again implying that condition-specific distress may be better than depression in terms of predicting metabolic management. These results suggest the possibility that the inconsistent findings mentioned above may be attributable to variations in the way depression and distress have been operationalized. The current report, therefore, specifically contrasts the ability of diabetes-specific distress and depression to predict HbA<sub>1c</sub>.

More broadly, the mixed evidence for the success of existing treatments for depression among patients with diabetes implies the need to consider alternate or supplementary approaches to the management of mood issues in this population. One area of emerging interest for treating emotional difficulties in both patient and non-patient populations is self-compassion. Defined as the practice of treating oneself with kindness in the face of negative events, self-compassion can be seen as an emotion regulation strategy by which painful feelings are not avoided, but are

Correspondence to: Nathan Consedine. E-mail: n.consedine@auckland.ac.nz

**What's new?**

- This cross-sectional study among patients with diabetes showed diabetes-specific distress to be a better predictor of HbA<sub>1c</sub> than depression.
- Self-compassion – a factor associated with a range of mental and physical health benefits – was found to moderate the relationship between distress and HbA<sub>1c</sub> such that higher distress predicted higher HbA<sub>1c</sub> at lower, but not higher, levels of trait self-compassion.

instead held with 'mindfulness awareness, understanding and a sense of common humanity' [12]. Relating to oneself with compassion (rather than criticism or judgement) has been linked to a range of positive psychological and physical health outcomes, including decreased depression and improved coping in patients with chronic illness [13], as well as enhanced self-care motivation [14], which may be central to sustaining the behaviours needed for optimum metabolic control. Finally, self-compassion may also have a role in improving physiological health processes of particular relevance to patients with diabetes, including inflammatory and sympathetic nervous system responses to stress, with recent studies showing higher self-compassion is linked to lower blood plasma levels of interleukin-6 [15] and improved heart rate variability [16].

In extending research in this area, this report draws on evidence linking effective self-regulation with improved health outcomes [17]. In addition to investigating the possibility that emotional distress specifically related to self-management failures may better predict metabolic control than depression, we test the possibility that being dispositionally self-compassionate may buffer the deleterious impact of negative emotionality on glycaemic indices. We evaluate whether self-compassion predicts improved metabolic control as measured by HbA<sub>1c</sub>, as well as exploring the possibility that, rather than having a direct main effect on metabolic outcomes, self-compassion might moderate the effect of negative affectivity on HbA<sub>1c</sub>.

**Patients and methods**

The study took place between July and November 2013, among patients of the Waitemata District Health Board's (WDHB) Diabetes Clinic, a multidisciplinary service with predominantly patients with Type 1 diabetes and those with more complicated Type 2 diabetes. All patients arriving for normal clinic visits over the four-month recruiting period were invited to take part via a poster advertisement at the clinic reception. Inclusion criteria were a minimum age of 18 years and a maximum age of 70 years, a diagnosis of either Type 1 or Type 2 diabetes and fluency in English. There were no exclusion criteria. Consenting participants received a questionnaire packet measuring trait self-compassion as well

as aspects of diabetes self-management previously linked to metabolic control; depression [18], distress [19], age and gender [20]. Ethnicity, diabetes diagnosis and age at diagnosis were also recorded. With permission, participants' most recent (within three months) HbA<sub>1c</sub> values were drawn from medical records.

**Measures**

The PHQ-9 [21] assesses the symptoms of major depressive disorder. Referring to a two-week time window, responders can choose to answer 'not at all', 'various days', 'more than half the days' and 'almost every day', with points assigned to each category. A summed score is calculated for the nine questions. The PHQ-9 is widely used, with excellent psychometric properties, and validated with patients with diabetes in both primary and specialized outpatient clinics [18]. Because depression and diabetes have several somatic symptoms in common, a higher cut-off point is considered appropriate for indicating the likelihood of major depressive disorder in diabetes than would be used with a medically well sample [18]. As such, a cut-off point of 12 or above was used in differentiating major depressive disorder from subclinical depression in this study, even though an effect of this increased cut-off may be reduced sensitivity and specificity. Alpha reliability for the current study = 0.88.

Diabetes-specific distress is a common condition that often includes high levels of negative affect. It is linked to poor bio-behavioural disease management [10]. The Diabetes Distress Scale-2 (DDS-2) is a two-item measure, derived from the 17-item Diabetes Distress Scale (DDS-17) asking respondents to rate on a 6-point scale the degree to which the following items caused distress: (1) feeling overwhelmed by the demands of living with diabetes, and (2) feeling that I am often failing with my diabetes regimen. Psychometric properties for the DDS-2 have been shown to approximate those for the longer DDS-17 [10]. Summed scores  $\geq 6$  on the DDS-2 indicate the presence of clinically relevant distress likely to be affecting diabetes management. Alpha reliability for the current study = 0.84.

The Self-Compassion Scale (SCS) [12] is a 26-item questionnaire measured using a 5-point Likert scale (*Almost never* = 1 to *Almost always* = 5), comprising positive subscales of self-kindness, common humanity and mindfulness, and negative subscales of self-judgement, isolation and over-identification. For example, the item 'when times are really difficult, I tend to be tough on myself', tests the capacity for self-kindness versus self-criticism. 'I try to see my failings as part of the human condition', tests the capacity to understand life's difficulties as part of being human, versus the tendency to isolate (reverse scored). 'When something upsets me, I try to keep my emotions in balance' tests the capacity for mindfulness versus over-identification with negative feelings (reverse scored). Studies [12,22] have demonstrated

satisfactory psychometric properties and good test–retest reliability. The SCS has good discriminant validity, including being distinguishable from self-esteem [12]. Factor analysis has confirmed the six-factor structure of the scale and the single higher-order component of self-compassion. The aggregate score in this study was acceptable,  $\alpha = 0.77$ .

### Participants

Of the 110 patients who completed the study, 67 had Type 1 diabetes, 20 had Type 2 diabetes, and 23 had Type 2 diabetes and were on insulin regimes. There were 38 males and 72 females in the sample and a mean age 47.64 years ( $SD = 15.2$ ). Ethnicity was predominantly New Zealand/European (73.6%), with Maori (7.3%), Asian (5.5%). Other Pacific (0.9%), Other European (10.9%) and Other (1.8%), approximating the ethnic make-up of the population served by the WDHB (see Table 1).

### Analytic strategy

All data were screened for statistical assumptions. Missing HbA<sub>1c</sub> data ( $n = 11$ ) was imputed by calculating the mean HbA<sub>1c</sub> scores for the sample. Covariates (gender and age) were identified using preliminary Pearson correlations (with Spearman rank used for the analysis of gender). Although there were no overall differences between patients with Type 1, Type 2, and Type 2 with insulin diabetes among the predictor variables of interest (distress, depression, self-compassion and HbA<sub>1c</sub>), dummy codes representing diabetes subtypes were used as control variables within each model, with the statistically most common patients with Type 1 diabetes defined as the referent group.

Commensurate with our research focus, the two key predictions were then tested using multiple regressions in which the effects of age, gender and subtype were controlled at Step 1. In the first model, the ability of depression versus diabetes-specific distress to predict HbA<sub>1c</sub> above confounds was tested using forward entry at Step 2 (an analytic approach that permits the algorithm to select the variable that best improves model fit, thus addressing the question of which of depression or distress is the better predictor). A second model then force-entered self-compassion and the interaction between self-compassion and distress in the second step. This approach permits an examination of whether self-compassion itself predicts HbA<sub>1c</sub>, as well as whether it moderates the negative effect of distress on HbA<sub>1c</sub>.

### Results

Preliminary correlational analysis (see Table 2) showed that age and gender were associated with the outcomes of interest (self-compassion, HbA<sub>1c</sub>, depression and diabetes-distress) and were therefore retained as controls. Because results indicated lower age was related to higher HbA<sub>1c</sub> ( $r = -0.27$ ), we conducted additional analysis in which this relationship was stratified by diabetes subtype. Results showed a significant negative relationship between age and HbA<sub>1c</sub> in the Type 1 group ( $r = -0.34$ ,  $P < 0.01$ ), but no relationship between the Type 2 ( $r = -0.17$ ,  $P = 0.48$ ) and Type 2 with insulin groups ( $r = -0.16$ ,  $P = 0.48$ ).

Correlations were found among the main predictor variables of interest; self-compassion, depression (PHQ-9) and diabetes-distress (DDS-2), ( $P < 0.001$ ). As self-compassion increased, depression and diabetes-distress scores decreased (see Table 2).

**Table 1** Demographic and clinical characteristics of the sample

Demographics	Total ( $n = 110$ )	Type 1 ( $n = 67$ )	Type 2 ( $n = 20$ )	Type 2 (insulin) ( $n = 23$ )
Female	72	41	15	16
Male	38	26	5	7
Age in years (SD)	47.6 (15.2)	41.7 (13.8)*	58.7 (12.9)*	55.4 (12.5)*
Ethnicity (% of total)				
NZ European	81 (73.6)	51 (76.1)	15 (75.0)	15 (65.2)
Maori	8 (7.3)	2 (3.0)	1 (5.0)	5 (21.7)
Asian	6 (5.5)	3 (4.5)	1 (5.0)	2 (8.7)
Other Pacific	1 (0.9)	1 (1.5)		
Other European	12 (10.9)	8 (11.9)	3 (15.0)	1 (4.3)
Other	2 (1.8)	2 (3.0)		
Clinical				
Years diabetic	16.7 (12.3)	18.9 (12.8)	8.0 (6.0)	17.2 (11.6)
HbA <sub>1c</sub> ; mmol/mol (SD)	69 (20.6)	70 (18.2)	62 (25.9)	73 (22.6)
HbA <sub>1c</sub> ; % (SD)	8.5 (1.9)	8.5 (1.7)	7.8 (2.4)	8.9 (2.1)
Depressed; PHQ-9 $\geq 12$ (% of total)	21 (19.1)	11 (16.4)	3 (15.0)	7 (30.4)
Distressed; DDS-2 $\geq 6$ (% of total)	62 (56.5)	34 (50.7)	12 (60.0)	16 (69.6)
Psychosocial				
Depression	6.8 (5.6)	6.1 (5.6)	6.8 (4.5)	8.7 (6.3)
Diabetes-distress	6.3 (2.7)	6.2 (2.6)	6.1 (2.8)	6.9 (3.0)
Self-compassion	80.0 (16.8)	79.4 (16.5)	84.7 (15.7)	78.1 (18.6)

\*Significant difference in age between patients with Type 1 and Type 2 diabetes,  $F(2,107) = 17.3$ ,  $P < 0.001$ .

**Table 2** Correlations between self-compassion (SCS), depression (PHQ-9), HbA<sub>1c</sub>, diabetes-distress (DDS-2), age and gender

Scale	1	2	3	4	5	6
1. Self-compassion	–	–0.57**	–0.58**	–0.17	0.29**	–0.13
2. Depression (PHQ-9)		–	0.63**	0.22*	–0.06	0.13
3. Diabetes distress (DDS-2)			–	0.33**	–0.15	0.24*
4. HbA <sub>1c</sub>				–	–0.27**	0.06
5. Age					–	–0.08
6. Gender <sup>†</sup>						–

\* $P < 0.05$  (two-tailed), \*\* $P < 0.001$  (two-tailed), <sup>†</sup>Spearman's rank correlation.

### Diabetes-specific distress versus depression predicting HbA<sub>1c</sub>

To assess the ability of distress versus depression to better predict metabolic control, control variables (age, gender and diabetes subtype dummy codes) were entered at Step 1, explaining 9.3% of the variance in HbA<sub>1c</sub>. Forward entry at Step 2 selected distress (rather than depression) into the model, which now explained 15.8% of the variance in HbA<sub>1c</sub>,  $F(5,104) = 3.92$ , an increase of nearly 7%,  $R^2\Delta = 0.07$ ,  $F\Delta(1,104) = 8.11$ ,  $P < 0.05$ . As expected, HbA<sub>1c</sub> increased as distress increased (see Table 3). In light of the fact that distress was selected rather than depression, subsequent analyses used diabetes-distress as the operationalization of negative affect that best predicted HbA<sub>1c</sub>.

### Self-compassion as a moderator of the link between distress and HbA<sub>1c</sub>

We began addressing this question by examining whether self-compassion predicted HbA<sub>1c</sub>. Confounds (age, gender and diabetes subtype) were entered in Step 1 as previously (see Model 1); with self-compassion entered at Step 2, the increase in explained variance was minimal and the model's ability to predict HbA<sub>1c</sub> was not improved,  $F(5,104) = 2.25$ ,  $R^2\Delta = 0.0$ ,  $F\Delta(1,104) = 0.54$ .

**Table 3** Statistics for multiple regression analysis with forward entry of diabetes-distress and depression at Step 2 for operationalization of 'negative affect' in predicting HbA<sub>1c</sub>

Variables	B	SE	$\beta$	$p$	$r^2$
Step 1					
Gender	1.17	3.88	0.03	0.00	
Age	–0.38	0.14	–0.29*	0.06	
Type 1 (Ref.)	–	–	–	–	
Type 2	–0.25	5.43	–0.01	0.00	
Type 2 Insulin	8.12	4.98	0.17	0.02	
Step 2					
Gender	–1.10	3.86	–0.03	0.00	
Age	–0.31	0.14	–0.24*	0.04	
Type 1 (Ref.)	–	–	–	–	
Type 2	–0.86	5.26	–0.02	0.00	
Type 2 insulin	5.93	4.88	0.12	0.01	
Distress	1.94	0.68	0.27*	0.03	

\* $P < 0.05$ .

Next, and given the strong univariate relationship between self-compassion and diabetes-distress (see Table 2), we explored the possibility that self-compassion would moderate the effect of distress in predicting higher HbA<sub>1c</sub>. As previously, control variables (age, gender and subtype dummy codes) were entered at Step 1. After entering distress, self-compassion, and the interaction between distress and self-compassion at Step 2 (see Table 4), the model now explained 19.8% of the variance in HbA<sub>1c</sub>,  $F(7,102) = 3.60$ , an increase of nearly 11%,  $R^2\Delta = 0.11$ ,  $F\Delta(3,102) = 4.50$ ,  $P < 0.05$ . Greater age and lower distress were related to lower HbA<sub>1c</sub>, and the interaction between self-compassion and distress was also significant. Partial correlations controlling for age, gender and diabetes subtype showed a positive relationship between distress and HbA<sub>1c</sub> among persons with lower self-compassion ( $M = 67.41$ ,  $SD = 11.00$ ),  $r^2 = 0.40$ ,  $P < 0.05$ , but no relationship between these variables among patients with higher self-compassion ( $M = 93.56$ ,  $SD = 9.91$ ),  $r^2 = 0.08$ .

## Discussion

The purpose of the current study was twofold: first, to contribute to research seeking to identify the specific aspects of negative emotionality that best predict HbA<sub>1c</sub> and second,

**Table 4** Statistics for multiple regression analysis showing self-compassion moderates the effect of diabetes distress on HbA<sub>1c</sub>

Variables	B	SE	$\beta$	$p$	$r^2$
Step 1					
Gender	1.17	3.88	0.03	0.00	
Age	–0.38	0.14	–0.29*	0.06	
Type 1 (Ref.)	–	–	–	–	
Type 2	–0.25	5.43	0.01	0.00	
Type 2 Insulin	8.12	4.98	0.17	0.02	
Step 2					
Gender	–0.81	3.78	–0.02	0.00	
Age	–0.34	0.14	–0.26*	0.06	
Type 1 (Ref.)	–	–	–	–	
Type 2	–1.18	5.19	–0.02	0.00	
Type 2 Insulin	5.20	4.85	0.11	0.00	
Diabetes-distress	2.12	0.81	0.29*	0.05	
Self-compassion	0.12	0.13	0.11	0.00	
Self-compassion × distress	–3.36	1.66	–0.18*	0.03	

\* $P < 0.05$ .

to explore the possibility that self-compassion might moderate the negative effects of distress on glycaemic outcomes.

The suggestion that distress specifically related to feelings of being overwhelmed by or failing to cope with diabetes self-management routines would better predict metabolic control was supported in this study. Although depression also predicted glycaemic control in univariate analyses, distress specifically related to diabetes self-management was preferentially selected in the model because it was a stronger predictor of metabolic outcomes than depression. The fact that distress was the better predictor is consistent with the findings of Fisher *et al.* [3], who found both concurrent and time-concordant relationships between diabetes-distress and HbA<sub>1c</sub>, but no relationship between major depression and metabolic control. One explanation for this may be that diabetes-distress is related to the specific behaviours that likely impact on metabolic control, for example, distress as a consequence failing to cope with diet and/or lifestyle prescriptions. By contrast, depression may be related to more generalized negative affectivity which likely reflects and impacts a broader range of behaviours and functioning that includes, but is not limited to, those that are diabetes-related.

Findings regarding our second hypothesis, that self-compassion would predict metabolic outcomes, were mixed. While not related to HbA<sub>1c</sub> per se, the greater capacity to direct kindness towards oneself – self-compassion – did predict lower diabetes-distress that, in itself, predicted better metabolic control (see above). Perhaps more to the point, self-compassion buffered patients from the negative effects of distress on HbA<sub>1c</sub>; although distress predicted HbA<sub>1c</sub> in the less self-compassionate portion of the sample, it was not linked to metabolic control among patients with higher self-compassion. This ‘buffering’ effect is consistent with recent research in which social support (arguably a form of kindness from others) reduced distress related to the burden of diabetes self-management [19] and buffered the effects of that distress on outcomes. The finding of the current study, therefore, supports the idea that a ‘one size fits all’ approach may not be helpful clinically, with individual difference variables (such as self-compassion) likely to affect the way in which a patient copes with the distress associated with their diabetes.

Although this finding is preliminary and in need of replication, three interpretations of this effect are possible. First, when people who are high in self-compassion experience distress related to their diabetes self-management, they may be less likely to engage in self-criticism and unhelpful behaviours such as isolating and over-identifying with negative thoughts. A degree of self-compassion may help patients avoid getting caught in a downward spiral of self-perceptions and behaviour that compromises their ability to maintain essential self-care regimes. Studies have shown that self-compassion leads to increased self-improvement motivations, possibly because self-compassion provides a non-judgemental context in which to appraise one’s strengths

and weaknesses and to strive to improve without the threat of self-criticism [23]. In the context of diabetes, enhancing self-compassion may thus enable patients to respond to evidence of less-than-ideal metabolic or behavioural control without being paralysed by self-criticism, permitting the reappraisal and adjustment of goals in support of good control. Prior research suggests that reacting to events with negative, self-focused emotions, such as shame, is associated with lower perceptions of self-efficacy [24], in turn suggesting that people who are higher in self-compassion may have more positive perceptions of their abilities.

Second, people high in self-compassion have been found to take greater responsibility for their problems and be less overwhelmed by difficulties, suggesting they are more likely to take care of themselves when ill [25]. For patients with diabetes, it may be that ‘taking care’ of the self includes behaviours associated with good metabolic control such as maintaining regular physical activity, appropriate dietary choices and regular self-monitoring of blood glucose.

Finally, it may be that people who are kinder to themselves are less physiologically aroused or ‘threatened’ by the distress associated with repeated self-management failures. Potentially, the buffering effect of self-compassion on the processes by which distress impacts on HbA<sub>1c</sub> may reflect the superior autonomic and inflammatory processes shown to be associated with the practice of self-kindness [20,25,26]. In one recent study, dispositional mindfulness (a core component of self-compassion) moderated the relationship between psychological distress and physiological stress reactivity, with distress associated with an elevated cortisol awakening response at low, but not high levels of mindfulness [27]. The results of the current study are in line with the theoretical proposition that self-compassion may calm the threat system, reducing autonomic and immune responses that are thought to be similar to those involved in diabetes disease processes [28].

In total, these data suggest that the tendency to be kind to oneself in the face of emotional distress may be associated with superior diabetes outcomes as measured by HbA<sub>1c</sub>. The prevalence of negative affectivity among patients with diabetes and its links to poorer metabolic control, as well as the lack of evidence that current treatment approaches predict consistent improvements in outcomes, suggest supplementary approaches to diabetes-related emotional distress may be useful. Self-compassion may be a valid target for clinical interventions in the context of a condition in which self-criticism and negative evaluations related to self-management performance are common themes.

#### Limitations and future directions

Although these data represent a useful contribution to recent work linking negative affectivity to metabolic control and illuminate a possible target for intervention, they are not without their limits; most obvious is the use of a self-report

scale for measuring self-compassion. As noted by Neff [12], a self-report measure will inevitably be limited in its ability to accurately assess individual levels of self-compassion because many people lack the awareness to recognize their own lack of self-kindness. Additionally, participants in this study were self-selected in that they chose to participate in a study investigating the benefits of self-compassion, so may in themselves be more open to the overall concept of kindness and not necessarily representative of patients with diabetes more generally. A further measurement limitation of this study is the use of the DDS-2, a short form measure used as the screening tool to detect diabetes-specific distress. Although the DDS-2 has strong psychometric properties and is substantially correlated with the full measure, future studies would nonetheless benefit from the use of the full-scale DDS self-report. Furthermore, as a cross-sectional study, directionality cannot be inferred, specifically in the relationships between self-compassion, distress and HbA<sub>1c</sub>. We also note the limited ethnic diversity of this sample, and the predominance of New Zealand European participants. In light of studies indicating clear differences in levels of distress by ethnic group, broader ethnic representation is also an important area to address in future studies. Finally, we note that comorbidities and diabetes complications were not assessed in this study, a limitation that may contribute to the reported results.

These limitations noted, the suggestion from the current study that self-compassion may be related to better psychological and physical health in this patient population is promising and worthy of further investigation, particularly in light of the challenges of living with diabetes and the devastating consequences of poor control. Self-compassion is both a tendency and a skill that can be developed or trained in patients, providing not only a tool with which to better handle the difficulties of living with diabetes, but also one that may also provide some protection against poor glycaemic outcomes. Future studies might investigate whether intervening to improve levels of self-compassion has an effect on key markers of effective control, including psychological, behavioural and physical health outcomes.

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#### Competing interests

None declared.

#### Author contributions

AF designed study, collected data, conducted analysis and wrote the manuscript. MJ provided input into design and documentation, assisted with analysis, reviewed/edited man-

uscript, contributed to discussion and provided supervision. RC provided clinical supervision and contributed to discussion. NC provided input into design and documentation, assisted with analysis, reviewed/edited manuscript, contributed to discussion and provided supervision.

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