Research: Educational and Psychological Aspects

Self-compassion is associated with optimum self-care behaviour, medical outcomes and psychological well-being in a cross-sectional sample of adults with diabetes

M. Ferrari1,2, M. Dal Cin1 and M. Steele3

1School of Psychology, Australian Catholic University, Strathfield, New South Wales, 2School of Psychology, University of Sydney, Sydney, New South Wales and 3School of Allied Health, Australian Catholic University, Brisbane, Queensland, Australia

Accepted 8 August 2017

Abstract

Aim To investigate the role of self-compassion in diabetes outcomes. Self-compassion is a construct which may be relevant to chronic conditions, given its focus on compassion toward oneself, especially in times of difficulty.

Methods In this cross-sectional study we collected data online from 310 adults diagnosed with diabetes. The questionnaire measured three primary outcomes: self-management behaviours; HbA1c levels and psychological well-being. Potential predictors were also assessed, including self-compassion, locus of control, social support and demographics.

Results Multiple regression analyses showed that self-compassion had the most consistent association with better outcomes, including all forms of self-management behaviour, HbA1c levels and psychological well-being. Self-compassion was independently associated with 55.1% of the variance in well-being. Internal locus of control was also significantly associated with better well-being and HbA1c outcomes. Chance and external locus of control and social support were generally associated with poorer outcomes.

Conclusions Higher levels of self-compassion are typically associated with improved self-management behaviour, medical outcomes and psychological well-being in adults with diabetes mellitus. The present findings suggest that self-compassion may be a parsimonious and suitable intervention target. Future interventions and consultations with medical professionals may benefit from fostering self-compassion in adults with diabetes mellitus.

Diabet. Med. 00, 000–000 (2017)

Introduction

Diabetes mellitus is a chronic metabolic disorder with rising incidence rates, and is widely acknowledged to be an international health crisis of the 21st century [1]. Type 1 and Type 2 diabetes have similar treatments and psychosocial challenges, despite their different biological aetiologies [2]. Both are emotionally and cognitively demanding diseases which require intensive and complex self-management behaviours, including dietary control, medication adherence, physical activity and blood glucose monitoring. Despite their importance in improving health outcomes, these self-management behaviours are often poorly followed, and rates of psychological distress and poor metabolic outcomes in this population remain high [3]. Indeed, adults with diabetes are three to four times more likely to experience anxiety and depression compared with the general population [3]. Even low levels of depression symptomatology may relate to poor engagement in self-management behaviours, and subsequent poor health outcomes [4].

Self-compassion, a construct from Buddhist origins, is a way of relating to oneself in times of pain or despair [5]. Self-compassion is characterized by a tendency to treat oneself with kindness, to be non-judgmentally mindful and present, and also to feel connected to common humanity and be accepting of flaws as part of the human condition [5]. Research suggests that self-compassion is distinct from other constructs such as self-esteem [6] and global personality measures [7]. A tendency to be self-compassionate is linked with psychological well-being [8], and intervention studies have shown it can be cultivated [9,10]. Meta-analyses have found that, in general populations, self-compassion significantly predicts positive health behaviours such as healthy eating, physical activity, sleep behaviour and effective stress

Correspondence to: M. Ferrari. E-mail: m.ferrari037@gmail.com

© 2017 Diabetes UK
What’s new?

• In a cross-sectional study in adults diagnosed with diabetes mellitus (N = 310) we found that self-compassion was consistently associated with better behavioural (self-management behaviours, exercise, blood glucose checking and healthcare use), metabolic (HbA1c) and psychological (well-being) outcomes.

• Independently, self-compassion accounted for a large proportion of variance in the outcomes compared with other known predictors, such as locus of control, social support and demographic variables (age, gender, education and relationship status).

• Our findings demonstrate the relevance of self-compassion to health behaviour in adults with diabetes mellitus, and empirically support the development of holistic psychological interventions targeting self-compassion for adults with diabetes mellitus.

management [10]. Self-compassion has also been found to predict better management of other chronic conditions such as breast cancer [11] and persistent musculoskeletal pain [12]. In light of this, self-compassion may also be related to resilience and persistence in the context of managing diabetes, and higher trait self-compassion may be related to better mental and physical health outcomes for this specific population.

To date, one group of researchers have specifically investigated self-compassion in relation to diabetes [9,13], with promising findings. In a New Zealand population, self-compassion buffered the negative effects of diabetes-specific distress on HbA1c, a measure of blood glucose concentration, over the preceding 3 months [13]. This finding is exciting given that the psychological construct self-compassion may be linked to a physical health outcome that is difficult to manage: general blood glucose levels across time. This research group also conducted a randomized controlled trial comparing a self-compassion intervention (n = 31) with a waiting list control (n = 32) for adults with diabetes [9]. The novel intervention led to a significant improvement in HbA1c level, depression symptoms, and diabetes-specific distress. As the potential for self-compassion interventions for adults with diabetes grows, it is vital we develop an underlying theoretical understanding of how self-compassion relates to both mental and physical outcomes within the context of this chronic health condition.

In addition to replicating and generalizing the results of the New Zealand studies [9,13], the aim of the present study was to investigate the direct relationship between self-compassion and health-related behaviour as well as metabolic (HbA1c) and psychological (well-being) outcomes, for adults with diabetes. We were also interested in controlling for variables which have previously been linked with metabolic outcomes for adults with diabetes including social support [14] and locus of control [15,16], and demographic variables including age [17], sex [18,19] and higher education [19]. Specifically, we predicted that self-compassion would be significantly associated with self-management behaviour, HbA1c levels and psychological well-being in adults with diabetes.

Methods

Participants and procedure

This cross-sectional study used an online questionnaire and convenience sampling. Advertising was via flyers posted in various public hospitals and diabetes centres in Sydney, as well as online forums and newsletters of several Australian diabetes organizations and Facebook support groups. Eligibility criteria included a diagnosis of diabetes by a medical clinician, aged >18 years, an ability to complete the questionnaires and provision of voluntary consent. Ethics approval was obtained from the ACU Human Research Ethics Committee (2015-90E), and participants entered a draw to win an Eftpos voucher worth $200. All data were collected between May and December 2015.

Measures

Demographic information and five validated self-report questionnaires were presented online in randomized order to avoid order effects. When reporting basic demographic information (age, relationship status, level of education acquired), participants were also asked for relevant medical information, such as most recent HbA1c reading, duration of diagnosis and type of diabetes diagnosis.

Self-compassion was the primary construct of interest in this study. The Self-Compassion Scale-Short Form (SCS-SF) [20] is a shorter form of Neff’s (2003) original Self-Compassion Scale. The SCS-SF is a reliable and valid scale comprising 12 items, which produces a total global score that can also be classified into two subscores: negative behaviours toward the self (six items) or positive behaviours towards the self (six items). Reliability of the total global score was strong (α = 0.85) and similar to previous research (α = 0.87) [20].

Three primary outcomes were also measured in this study: self-reported HbA1c level; self-management behaviour; and psychological well-being. The Diabetes Self-Management Questionnaire [21] uses 16 items to assess self-management activities associated with metabolic control. The scale includes four subscales: glucose management; dietary control; physical activity; and healthcare use, as well as a global total score. Cronbach’s α was strong in the present study (α = 0.81), and similar to previous research in populations with diabetes (α = 0.84) [21]. The Well-being Questionnaire [22] was used as a general measure of psychological well-being reflecting depression, anxiety and energy symptoms as well as positive well-being. This 22-item questionnaire was
specifically developed to measure well-being in populations with diabetes (internal consistency was adequate: $\alpha = 0.66$).

Other research has argued that self-management behaviour can be predicted by constructs such as social support from family and friends [14] and locus of control [15,16]; thus, both were measured and controlled for in the present study. Current treatment guidelines recommend the inclusion of family in ongoing education and support for adults with diabetes [23], as support from cohesive families helps to improve metabolic outcomes [14]. The Diabetes Family Behavior Checklist assesses support provided by family members in relation to diabetes-specific self-management behaviours [23]. Participants are required to report on a five-point scale how often family members perform specific support or unsupportive behaviours. This scale showed strong reliability in the present study (Chronbach’s $\alpha = 0.77$).

Locus of control refers to the extent to which individuals believe their health is a result of their own (internal) behaviour, the behaviour of others, such as a doctor (external), or luck (chance). An internal locus of control has been linked to a range of positive health behaviours, such as regular exercise and healthy eating habits [16], over and above external or chance locus of control. The Diabetes Locus of Control Scale [24] measures locus of control beliefs along three dimensions: ‘internal’, ‘powerful others’ and ‘chance’. The 18-item scale has been widely validated in adult populations diagnosed with diabetes, and has sound psychometric properties [25]. In the present study, internal and powerful others items had acceptable Chronbach’s $\alpha$ values ($\alpha = 0.81$ and $\alpha = 0.74$, respectively), but chance did not ($\alpha = 0.57$).

**Planned analyses**

Planned analyses included descriptive, correlational analyses and a series of regression analyses. The regression analyses were intended to assess the strongest predictors of key outcomes including overall well-being, HbA1c and self-management behaviours. Given the diversity of research in the field of diabetes self-management, and position of self-compassion as a newly emerging construct likely to be relevant, we used multiple regression with a backward elimination procedure to identify the predictive value of each variable in an exploratory manner rather than being theory- or data-driven [26]. This procedure removes non-significant variables one by one, and reassesses the model at each stage to determine the significance of each of the remaining variables.

**Results**

**Data screening**

The data from 310 participants were analysed. Participants excluded were those who dropped out before completing the first scale ($n = 56$), those missing more than a third of their data ($n = 32$), those not meeting inclusion criteria ($n = 2$), those completing the questionnaires in $<5$ min, which was deemed highly unlikely to provide reliable results ($n = 8$), and those identified as outliers by influence using Cook’s calculation ($n = 8$). HbA1c reporting had an unusually high number of missing data (not reported in 72 participants, 23%), but all other variables had $<5\%$ missing values. Little’s missing completely at random (MCAR) test showed that any missing data was at random (Little’s MCAR test: chi-squared $= 125.55$, $df = 114$, $P = 0.216$). All collected data were screened for statistical assumptions and no gross violations were found. One-way ANOVA found no significant effect of diagnosis type on HbA1c reading [$F(3,306) = 0.87$, $P = 0.457$], well-being [$F(3,306) = 0.28$, $P = 0.842$], or overall self-management behaviour [$F(3,306) = 1.22$, $P = 0.304$]; therefore, all diabetes diagnoses were analysed together.

**Participant characteristics**

Of the sample, 81.3% were women, 69.7% were Australian and the mean (range; SD) age was 37 (18–86; 15.1) years. The majority were diagnosed with Type 1 diabetes (65.5%), followed by Type 2 diabetes (23.5%). The majority of participants used insulin needle injections (44.8%), and diet and exercise to manage their disease (31.6%). The time since diagnosis ranged widely, from 1 month to 61 years (mean = 13.3 years, SD 12.4 years). The mean (SD) HbA1c reading was 61 (17.5) mmol/mol [7.7 (1.6)%] in the current sample. See Table 1 for further demographic statistics.

**Correlations among predictors and outcomes**

A pattern of significant, moderate correlations consistent with the current hypotheses was found (Table 2). Of particular note, self-compassion was significantly and positively correlated with higher well-being ($r = 0.74$), lower HbA1c reporting (indicating better health outcomes; $r = -0.23$) and higher engagement with all self-management behaviours, most strongly dietary care ($r = 0.36$) and physical activity ($r = 0.31$). A reviewer of the present paper suggested we run additional analyses to examine the effect of the positive items and negative items of the SCS-SF scale on the outcome variables distinct from the total score (also in Table 2). These analyses showed that correlations with self-compassion total scores for the positive ($r = 0.78$) and negative ($r = 0.90$) subscale scores were both high and significant, and the two subscales were moderately and significantly correlated with each other ($r = 0.43$). Moreover, as the negative subscale scores had been reverse-coded in accordance with the scoring instructions, both subscales had similar correlations across all outcomes but were weaker than the correlations between the total self-compassion score and each outcome. The only instance when this was not the case was for HbA1c, which had a slightly higher correlation.
with the positive subscale ($r = -0.26$) than the negative subscale ($r = -0.15$) or total score ($r = -0.23$). Taken together, this suggests that little additional information is gained from separating the total score into two subscores, thus the total self-compassion score was used in the regression analyses.

### Regression analyses

Linear multiple regression analyses with backward elimination were conducted to identify the strongest predictors of all primary outcomes including well-being, HbA1c, and self-management total and subscale scores (Table 3). Independent variables were entered into the regression model together, including age, sex, relationship status, all forms of locus of control, social support and self-compassion. Categorical variables were further dichotomized into new variables as follows: relationship status (single/not, in a relationship/not which means that the married response was not needed to be included as a separate variable) and education level status (high school/not, Technical and Further Education (TAFE)/not, university undergraduate/not, which meant that university PhD/not university PhD did not need to be included as a separate variable). TAFE refers to vocational tertiary education courses in Australia, predominantly run by the government.

When predicting self-management total scores, eight variables were removed as they were not significant, and four variables remained in the model (self-compassion, high school education, TAFE and undergraduate education). Together, these four variables significantly predicted only $12.1\%$ of the variance in self-management behaviour total scores. Better self-management total scores were predicted by higher self-compassion, and by having a university graduate degree rather than TAFE or undergraduate studies.

Table 3 also reports the regression models for the four core self-management behaviours. When predicting dietary care, an internal locus of control, and being married rather than in a relationship or single, significantly predicted $17.4\%$ of the variance in dietary care outcomes. When predicting physical activity, higher levels of internal locus of control, self-compassion, social support and education significantly predicted $16.1\%$ of the variance in physical activity engagement.

When predicting healthcare use, higher self-compassion, being female and having less social support significantly predicted a relatively low $7.1\%$ of the variance in healthcare use. When predicting glucose management, higher social support and self-compassion, as well as completing university graduate studies rather than TAFE, predicted a relatively low $6.8\%$ of variance in glucose management behaviour.

When predicting HbA1c levels, six predictors remained in the model (internal, external and chance locus of control, social support, self-compassion and TAFE education), significantly predicting only $16.8\%$ variance in HbA1c. Better HbA1c readings, as indicated by lower reported numbers, were significantly predicted by higher internal locus of control and higher self-compassion, as well as lower external and chance locus of control, lower social support and by completing university graduate studies rather than TAFE.

When predicting well-being, six variables remained in the model (gender, internal locus of control, powerful others locus of control, chance locus of control, self-compassion and TAFE education level), significantly predicting $60.0\%$ of the variance in well-being. Better psychological well-being was explained by a tendency to be male, have a stronger internal and weaker external and chance locus of control, and higher levels of self-compassion. Adults were also significantly more likely to have higher well-being if they had completed university graduate studies than TAFE.

### Strength of self-compassion as an independent predictor

To better ascertain the degree to which self-compassion was contributing to the predicted variance across each model, individual regression analyses were also conducted with only self-compassion as a predictor. Self-compassion predicted a high and significant proportion of the variance for well-being ($r^2 = 55.1\%$, $F(1,1308) = 377.9$, $P < 0.001$) and a relatively
<table>
<thead>
<tr>
<th>Outcomes</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>7(a)</th>
<th>7(b)</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Well-being</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.26**</td>
<td>0.23**</td>
<td>0.16**</td>
<td>0.38**</td>
<td>0.41**</td>
<td>0.74**</td>
<td>0.55**</td>
</tr>
<tr>
<td>2. HbA1c</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.37**</td>
<td>-0.28**</td>
<td>-0.31**</td>
<td>-0.27**</td>
<td>-0.23**</td>
<td>-0.26**</td>
<td>-0.15**</td>
</tr>
<tr>
<td>3. Healthcare use</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.45**</td>
<td>0.37**</td>
<td>0.24**</td>
<td>0.21**</td>
<td>0.17**</td>
<td>0.18**</td>
<td>0.05</td>
</tr>
<tr>
<td>4. Glucose management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.29 **</td>
<td>0.13 *</td>
<td>0.15 *</td>
<td>0.14 *</td>
<td>0.12 *</td>
<td>0.05</td>
<td>-0.05</td>
</tr>
<tr>
<td>5. Dietary care</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.42 **</td>
<td>0.36 **</td>
<td>0.29 **</td>
<td>0.32 **</td>
<td>0.16 **</td>
<td>0.03</td>
<td>-0.16**</td>
</tr>
<tr>
<td>6. Physical activity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.31 **</td>
<td>0.214*</td>
<td>0.28 **</td>
<td>0.16 **</td>
<td>-0.12 *</td>
<td>-0.17**</td>
<td>-0.19**</td>
</tr>
<tr>
<td>Predictors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Self-compassion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7(a) SCS, positive items</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7(b) SCS, negative items</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Internal locus of control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. External locus of control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Chance locus of control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Social support</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SCS-SF, Self-Compassion Scale-Short Form. *P < 0.05 (two-tailed); **P < 0.001 (two-tailed); †SCS-SF negative items reverse-scored. Correlations >0.30 in bold.
low proportion for self-management total score (10.5%) and physical activity (9.2%). Self-compassion also predicted a significant but smaller proportion of variance for HbA1c (5.1%), healthcare use (4.1%) and glucose management (1.9%).

**Discussion**

The primary hypotheses of this study were supported. Self-compassion was significantly and most commonly associated across both mental and physical health outcomes for adults with diabetes. These outcomes included total self-management scores and three types of self-management behaviour: physical activity, healthcare use and glucose management, in addition to HbA1c readings and psychological well-being.

When analysed independently, self-compassion accounted for a high proportion of variance across these variables, including 55.1% of variance in well-being. Internal locus of control was the next construct most commonly associated with mental and physical health outcomes including well-being, HbA1c, diet and physical activity. Comparatively, social support predicted poorer HbA1c levels and engagement in less physical activity. External and chance locus of control both predicted poorer psychological well-being and poorer HbA1c readings. For some outcomes, it is important to note that the percentage of variance accounted for was often quite small, for example healthcare use ($r^2 = 0.07$) and glucose management ($r^2 = 0.07$). This may indicate that these behaviours are complex and not adequately captured by the predictive model.
Taken together, the present results indicate that self-compassion is a psychological construct that relates to a range of general positive mental and physical outcomes for adults with diabetes. An internal locus of control was also related to beneficial outcomes, however, these relationships were generally weaker and not present for overall self-management behaviour, healthcare use and glucose management. Thus, although developing a high internal locus of control and perceived ability to manage one’s health condition remains relevant and of importance, self-compassion seems to be a more globally relevant construct. The present results suggest self-compassion could be an ideal and parsimonious intervention target for both psychological and physical health outcomes. Previous research has consistently shown that medical outcomes and psychological well-being are closely intertwined for adults with diabetes [4,27,28]; thus, improvements in self-compassion may compound the positive effects of both psychological and medical outcomes.

The demands of managing diabetes emphasize the need for self-compassion. High internal locus of control and knowledge may promote persistence at self-management behaviour, yet in the event of inevitable hypoglycaemia or a health complication, such personal responsibility may turn into self-criticism and self-blame. Clinical psychology research argues these responses weaken a person’s emotional resilience [29], which in the context of diabetes is likely to weaken one’s ability to recover and persist at their self-management plan in times of crisis. The present study suggests that self-compassion may foster a more adaptive and resilient response to inevitable medical obstacles or instances of poor health for adults with diabetes.

The relationship between self-compassion and all four types of self-management behaviour in the present study may also explain the success of the only randomized controlled trial to date which has examined a self-compassion intervention on metabolic and psychological outcomes for adults with diabetes [9]. If adults are frequently engaging with medical services and encouraging early detection of complications (healthcare use), appropriately managing their blood glucose levels and maintaining a healthy diet and frequent physical activity, it is likely they will experience good health both psychologically and physically. The present findings suggest these behaviours may be more likely to occur with higher levels of self-compassion.

Whilst the present study found that self-compassion, as measured by the SCS-SF, did significantly relate to outcomes of interest, it is important to acknowledge the potential shortcomings of this construct. Recently, Pfattheicher et al. [30] have argued that the negative items on the self-compassion full scale are highly correlated with neuroticism (r ≥ 0.85) and offer no additional predictive validity beyond a measure of neuroticism. Pfattheicher et al. [30] do acknowledge that the construct self-compassion has clinical utility through outlining strategies to deal with painful experiences (which are not offered by the absence of neuroticism), yet the authors also conclude that further research into our theoretical conceptualization of self-compassion is required. Whilst this train of inquiry is beyond the scope of the present study, we did briefly look at the two subscale scores (positive and negative) of the SCS-SF in addition to the total score. We found that the two subscores were moderately correlated with each other. This moderate correlation is indicative of related yet distinct components and, unsurprisingly, both positive and negative subscores were significantly and highly correlated with the total score. Interestingly, the correlations between both subscales and total score had similar strength across all outcomes; however, in the majority of cases the total score produced the highest correlation (above either positive or negative subscales). Taken together, this study found that a tendency to be compassionate toward oneself, including both positive and negative elements, is a construct relevant to adults with diabetes and their health behaviour, psychological well-being and metabolic outcomes.

Challenges to the validity of the findings in the present study are common to online questionnaires. Self-report relies on the honesty and diligence of participants as well as self-awareness [3,13]. In addition, although HbA1c is an objective measure, it was self-reported in this study and unreported by many participants (23%). This may be problematic if failure to disclose was attributable to a confounding constant such as shame or a lack of knowledge about one’s current health. It is also likely that there are other relevant psychosocial predictors that were not assessed in this study. Such predictors may include whether the participants regularly engaged in meditation practice, were Buddhist, or engaged in other activities which may have influenced one’s self-care or level of self-compassion. This study does, however, contribute to a growing interest in the relevance of self-compassion to diabetes. Future psychological interventions may be improved by directly targeting important self-management behaviours by encouraging self-compassion in times of difficulty.

Funding sources
None.

Competing interests
None declared.

References


