Relationship between health status, illness perceptions, coping strategies and psychological morbidity: A preliminary study with IBD stoma patients

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Abstract

Background and aims: Individuals living with IBD and a stoma are at an increased risk of anxiety and depression and it is likely that several factors mediate these relationships, including illness perceptions and coping strategies. Using the Common Sense Model (CSM), this study aimed to characterize the mediators of anxiety and depression in an IBD stoma cohort.

Methods: Eighty-three adults (23 males) with a stoma (25 ileostomy, 58 colostomy; 26 emergency, 57 planned, 55 permanent, 28 temporary) completed an online survey. Health status was measured with the Health Orientation Scale (HOS), coping styles assessed with the Carver Brief COPE scale, illness perceptions explored with the Brief Illness Perceptions Questionnaire (BIPQ), and anxiety and depression were measured using the Hospital Anxiety and Depression Scale (HADS).

Results: Combining the questionnaire data using structural equation modeling resulted in a final model with an excellent fit (χ² (11) = 12.86, p = 0.30, χ²/N = 1.17, SRMR < 0.05, RMSEA < 0.05, GFI > 0.96, CFI > 0.99). Consistent with the CSM, health status directly influenced illness perceptions, which in turn, influenced coping (emotion-focused and maladaptive coping). Interestingly, months since surgery was found to influence illness perceptions and emotion-focused coping directly, but not health status. While depression was influenced by illness perceptions, emotion-focused coping and maladaptive coping, anxiety was only influenced by illness perceptions and maladaptive coping.

Conclusions: The preliminary results provide further evidence for the complex interplay between psychological processes. In terms of directions for psychological interventions, a focus on identifying and working with illness perceptions is important.

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1. Introduction

Epidemiological studies have provided evidence that in comparison to community samples, individuals with Inflammatory Bowel Disease (IBD) are at an increased risk of experiencing anxiety and mood disorders, in terms of point and lifetime prevalence.1–3 For example, in terms of frequency, Walker and colleagues1 found that the rates of depression and panic disorder were significantly higher than matched community samples (27% versus 12%; 8% versus 4.7%, respectively). Further rates of adjustment, anxiety and depressive disorders have been found to be higher in IBD cohorts when compared to other chronic illnesses, such as colorectal cancer and Irritable Bowel Syndrome (IBS).1–11 IBD cohorts also report reduced self-esteem, increased body image concerns12,13 and sexual difficulties.14

The rate of psychological disturbance among individual’s with a gastrointestinal stoma has been found to be up to four times that of the general population,15 with significantly higher levels of depression and anxiety.16,17 Having a stoma has also been found to be associated with a reduction in quality of life (QoL),17–20 lowered self-esteem,21–23 and libido,24 and increased irritability,23 loneliness21 and suicidal ideation.24 The social impact for individuals with a stoma can be debilitating, with not only social isolation, but also disruptions to work schedules and travel.20,25,26 Compounding these problems are stoma-related problems including skin irritation and bag leakage.17,27,28

Stoma adjustment has been associated with several factors, both directly and indirectly via mediating relationships. These factors include clinical variables (e.g., stoma type29,30; stoma duration30,31; cause of illness30; demographic variables such as age31; gender22,29,31,32) and psychological variables such as coping styles,26,30,32 Coping can be thought of as the way an individual manages or deals with their stress.33 An individual’s coping strategies have been found to mediate the impact on their psychological well-being.34 Extending upon earlier work by Lazarus and Folkman,33 Carver and colleagues34 identified that coping strategies can be broken down into three categories: problem-focused (e.g., planning, seeking support),35,36 emotion-focused (e.g., seeking emotional support, accepting)37,38 and disengagement or maladaptive (e.g., use of alcohol, venting of emotions). Both problem-focused coping and emotion-focused coping have been found in research to be associated with more favorable outcomes compared to maladaptive coping strategies, which has been found to be associated with increased psychological distress and reduced QoL.35,39–43 For a recent review of the coping research within IBD cohorts, see McCombie et al.44

According to the Common Sense Model (CSM) developed by Leventhal and colleagues,45 the outcomes of an illness are not directly influenced by the illness itself, but also by mediating factors such as an individual’s perception of their illness and in turn their chosen coping strategy based upon their appraisal. That is, an individual’s beliefs about their illness (e.g., ‘I will need a stoma forever’) mediate the relationship between the illness status (e.g., ‘my IBD is active and causing pain’) and in turn, coping (e.g., ‘I’ll avoid thinking about it’) and outcomes (e.g., increased depression and anxiety). Also, coping strategies mediate the relationship between an individual’s perception of the illness and the outcome.45

The efficacy of the CSM has been evident across a diverse range of applications among chronic illnesses such as coronary heart disease,46 Huntington’s disease,47,48 multiple sclerosis,49 chronic fatigue syndrome,50 IBD,51,52 arthritis53 and a number of cancers.54 Evidence for the interrelationships within the CSM variables and outcomes, including anxiety and depression and quality of life has been found across several illness cohorts, including IBD.51,55 Further, support for mediating roles in coping strategies50,53 and illness perceptions56 have been found. For a detailed review relating to the evidence for the CSM, see a recent meta-analysis of 45 studies by Hagger et al.56

Despite numerous studies assessing individual aspects of the CSM (e.g., impact of illness and illness beliefs on outcomes such as anxiety and depression; influence of coping strategies on outcomes), Hagger et al.52 argued that future research should evaluate the CSM in its entirety. To address this limitation, Knowles and colleagues52 conducted a Structural Equation Model (SEM) to evaluate the entire CSM using an IBD cohort. Knowles and colleagues found strong evidence for the CSM: Health status (also known as illness activity) had a direct influence on illness perceptions; illness perceptions had a direct influence on depression and anxiety; and that utilization of maladaptive coping (termed emotional coping in their paper) was associated significantly with increased anxiety and depression symptoms.

1.1. Study aim and hypotheses

Using Structural Equation Modeling (SEM), the aim of the current study was to explore the impact of having a stoma in an IBD cohort utilizing the CSM. Consistent with the CSM and previous research,52 we hypothesized that poorer illness status would have an adverse correlation with illness perceptions and psychological distress, specifically anxiety and depression. Months since surgery would have negative a correlation with illness status, illness perception, maladaptive coping and anxiety and depression. In contrast, months since surgery would have a positive correlation with emotion-focused and problem-focused coping. It was also hypothesized that an inter-relationship would exist between health status, coping style, illness perceptions and psychological distress.

2. Materials and methods

2.1. Patients

Eighty-three adults (23 males) with a stoma (25 ileostomy, 58 colostomy; 26 emergency, 57 planned, 55 permanent, 28 temporary) completed an online survey. Each participant identified having a stoma due to IBD (62.7% with UC). The average age was 38.48 (SD = 120.74). Inclusion criteria included the following: having an ileostomy or colostomy stoma and aged between 18 and 40 years. Ethical
treatment can help your illness?

the items with higher scores indicating a more threatening illness representation score was obtained by averaging all these included use of emotion-focused coping. Derived: maladaptive coping, problem-focused coping and

2.2.2. Brief Illness Perceptions Questionnaire (BIPQ)

The Brief Illness Perceptions Questionnaire (BIPQ) was used to measure cognitive and emotional representations of illness, specifically treatment control, timeline, personal control, consequences, identity, understanding, emotional response and concern. Each of the eight items is assessed on a 4-point Likert scale (range 0–4), with higher scores indicating a greater use of the coping style.

2.2.4. Hospital Anxiety and Depression Scale (HADS)

The HADS is a 14-item self-report questionnaire assessing levels of depression (DEP; 7 items) and anxiety (ANX; 7 items) over the past week. Each question is assessed on a 4-point Likert Scale: “I can laugh and see the funny side of things” (0 = most of the time 3 = not at all). Using all seven items depression had a strong internal consistency (0.86). Anxiety was also found to have a strong internal consistency (0.90) using all seven items. Each of the subscale scores was attained by summing the subscale items (subscale ranges 0–21), with higher scores indicating a greater severity. Based on previous research mean subscale values were interpreted as 0–7 indicating “normal”, 8–10 indicating “mild severity”, 11–15 indicating “moderate severity”, and 16–21 indicating “severe severity”.

2.3. Procedures

Participants were advised of the research project through online links on relevant health organizations such as stoma associations (e.g., Crohn's and Colitis Australia, CCA), ostomy support groups on Facebook (e.g., uncover ostomy, United Ostomy Association, ostomy lifestyle), and internet health forums (e.g., HealingWell). Between the 5th of August 2009 and the 12th of August 2010 participants could complete the online questionnaire, taking approximately 20 min.

2.4. Statistical analyses

Exploratory analysis and visual inspection of the data indicated that all of the study variables met the necessary assumptions for statistical analysis (e.g., normality, linearity). All questionnaires were assessed using Cronbach's alpha analyses. Correlational analyses were undertaken to compare the relationship between the study variables: health status, illness perceptions, maladaptive coping, emotion-focused coping and problem-focused coping, and anxiety and depression.

Initial analyses indicated no significant differences across the study variables by illness condition (UC versus CD),
stoma location (ileostomy versus Colostomy), stoma status (temporary versus permanent) or gender. Consequently, these variables were not accounted for in the subsequent structural equation model (SEM) analyses. As months since surgery had a significant correlation with the study variables, it was included in the SEM. The final model was derived by adding pathways, based on Amos modification indices that resulted in pathways that were both significant and improved the model’s fit. Consistent with Hu and Bentler63 and our previous publications in the area52,64 criteria used to specify paths or variables to be added were based on inspection of standardized residuals, modification indices and a significant improvement in fit (i.e., significant change in $\chi^2/N$ and an increase in standard goodness of fit measures [$\chi^2, p > 0.05$; $\chi^2/N = 1–3$, $CFI > 0.095$, $RMSEA < 0.07$, $CFI > 0.95$, $SRMR < 0.08$, $GFI > 0.95$]). Single indicator latent variables were specified with subscale internal consistency and variance in order to reduce measurement error in the model.

3. Results

Within this cohort, 50% and 84% identified normal levels of anxiety and depression respectively. Six percent had mild depression, while 10% had moderate depression severity. Regarding anxiety, 24% had mild severity, 16% had moderate, and the remaining 10% had severe anxiety. These results would suggest that anxiety was the most common form of psychological distress. As shown in Table 1 (descriptive and correlational analyses), months since surgery had a significant negative correlation with illness perceptions, problem- and emotion-focused coping, and anxiety. Although not significant, utilization of maladaptive coping and depression symptoms was also found to reduce with months since stomal surgery. Months since stomal surgery were not found to be related to health status.

Health status and illness perceptions were found to have significant negative correlations with maladaptive coping and anxiety and depression symptoms. Health status and illness perceptions had a significant negative correlation indicating individuals with poorer health status reported poorer illness perceptions.

Regarding coping styles, maladaptive coping was positively related to anxiety and depression, indicating that engagement in maladaptive coping was associated with increased anxiety and depressive symptoms. In contrast, emotion-focused coping had a negative correlation with depression. Problem-focused and emotion-focused coping had a significant positive correlation suggesting that individuals who utilize problem-focused coping were also likely to engage in emotion-focused coping. Anxiety and depression also had a significant positive correlation suggesting that as symptoms of anxiety increase so do depressive symptoms and vice-versa.

To explore the possible inter-relationships and test the efficacy of the CSM, a path analysis was developed using Amos. As shown in Fig. 1, all of the study variables with the exception of problem-focused coping were retained in the model. Regarding demographic variables, only months since surgery was retained in the final model. Despite the small sample size, the final model had an excellent fit ($\chi^2 (11) = 12.86, p = 0.30$, $\chi^2/N = 1.17$, $SRMR < 0.05$, $RMSEA > 0.96$, $CFI > 0.99$). The total amount of variance accounted for in each of the variables was also good: 61% of illness perceptions, 14% emotion-focused coping, 46% of maladaptive coping, 68% of depression and 65% of anxiety symptoms.

Consistent with the CSM and study hypotheses, health status had a significant direct influence on illness beliefs, as did months since surgery. The final model indicated that months since surgery also had a significant direct influence on emotion-focused coping and that in turn had a direct impact on depression. These results are inconsistent with the study hypotheses and the CSM given that illness perceptions did not act as a mediator between months since surgery and emotion-focused coping. Consistent with the study hypotheses and CSM, illness perceptions were found to mediate the relationship between health status and maladaptive coping, anxiety and depression. Also consistent with the CSM and the study hypotheses, were the findings that maladaptive coping mediated the relationship between illness perceptions and anxiety and

<table>
<thead>
<tr>
<th></th>
<th>Months since surgery</th>
<th>Health status</th>
<th>Illness perceptions</th>
<th>Problem-focused coping</th>
<th>Emotion-focused coping</th>
<th>Maladaptive coping</th>
<th>Anxiety</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health status</td>
<td>0.06</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>9.45 (4.79)</td>
</tr>
<tr>
<td>Illness perceptions</td>
<td>–0.34 **</td>
<td>–0.53 ***</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>5.21 (1.98)</td>
</tr>
<tr>
<td>Problem-focused coping</td>
<td>–0.23 *</td>
<td>–0.07 0.11</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>1.69 (0.80)</td>
</tr>
<tr>
<td>Emotion-focused coping</td>
<td>–0.36 *</td>
<td>–0.01 0.10</td>
<td>0.69 ***</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>1.69 (0.74)</td>
</tr>
<tr>
<td>Maladaptive coping</td>
<td>–0.21 *</td>
<td>–0.48 *** 0.55 ***</td>
<td>0.24 *</td>
<td>0.15</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>0.96 (0.62)</td>
</tr>
<tr>
<td>Anxiety</td>
<td>–0.25 *</td>
<td>–0.58 *** 0.62 ***</td>
<td>0.15</td>
<td>–0.02</td>
<td>0.62 ***</td>
<td>–</td>
<td>–</td>
<td>7.57 (5.16)</td>
</tr>
<tr>
<td>Depression</td>
<td>–0.19</td>
<td>–0.48 *** 0.54 ***</td>
<td>–0.10</td>
<td>–0.26 *</td>
<td>0.56 ***</td>
<td>0.72 ***</td>
<td>4.31 (4.01)</td>
<td></td>
</tr>
</tbody>
</table>

* $p < 0.06$.
** $p < 0.05$.
*** $p < 0.01$.
**** $p < 0.001$. 

Table 1 Pearson’s correlations (and significance values) and descriptive values of CSM variables.
depression. These findings suggest that poorer illness perceptions are associated with increased engagement in maladaptive coping, which in turn had an adverse impact on their anxiety and depressive symptoms. Depression and anxiety also had a significant positive correlation.

4. Discussion

The aim of the current study was to explore the impact of having a stoma in an IBD cohort utilizing the CSM. The results indicated that the burden of IBD and having a stoma was associated with psychological distress. Fifty percent reported higher than normal levels of anxiety (10% reported severe anxiety) and 16% reporting mild to moderate levels of depression. These findings are consistent with previous research suggesting that moderate to high levels of psychological distress are found in IBD and stoma cohorts.15–17

Consistent with previous research and the CSM, health status had a significant adverse influence on illness perceptions, and that illness perceptions in turn had a direct (and indirect) influence via maladaptive coping, on anxiety and depression.45,51,52,56 Our results are also consistent with previous research indicating links between reduced physical health, poorer illness perceptions65 and increased anxiety and depression symptoms.48,66 Also consistent with past research was our finding that engaging in maladaptive coping was associated with increased anxiety and depressive symptoms.32,52,67,68 Consistent with our previous research52 was the current finding that maladaptive coping was a stronger predictor of depression than emotion-focused coping (identified as problem focused coping in our previous paper) and that emotion-focused coping did not predict anxiety.

Inconsistent with expectations and the CSM, months since surgery was not directly influenced by either health status or illness perceptions. Further, emotion-focused coping was directly influenced by months since surgery, but not illness perceptions. These findings could suggest that time since surgery affects perceptions rather than current symptoms, which is more influenced by current symptoms, which include stoma related (e.g., ability and concerns about going out). The direct influence of time since surgery on emotion focused coping, suggests that the more recent the surgery, the more likely you are to use other coping strategies, such as maladaptive (e.g., ignoring the problem) and that the further in time since the surgery the more able individuals are able to utilize other coping strategies to manage improve mood.

4.1. Limitations and future studies

Sample sizes of over 200 are recommended for this type of study.69 However, this study was based upon a valid model and well-published measures with strong psychometric properties. Given this, a smaller sample size was acceptable although further larger studies are required to confirm these preliminary findings. Another limitation that should be noted is the focus on anxiety and depression, without including other important outcomes, such as QoL. It should also be recognized that IBD severity was not directly assessed, but instead based on a perceived physical health scale. Although the health status subscale57 is valid and has high psychometric properties, future studies should attempt to measure IBD severity using IBD specific measures. Several limitations in terms of the demographic features of the non-clinical (internet-based) sample should be noted. As 72% of the sample were females and the study did not assess for the location and possible differences in hospital/health care support replication of this study is needed. Also due to the online recruitment procedure, diagnosis and status of health and stoma were based on self-report and not on a health professional. It should also be noted that the possible influence of self-efficacy, social support and difficulties relating to stoma self-care was not accounted for and it is likely these factors may also influence outcome as well as illness perceptions and coping. Future studies could explore the impact of a stoma on IBD disease activity, coping skills before and after stoma closure, and further extend on the CSM with additional factors that have been identified in the literature that impact on illness and quality of life such as personality70,71 and self-esteem.72 Future studies should
also consider comparing online versus clinical (i.e., hospital-based) cohorts to allow for greater understanding between these two groups and under what circumstances generalizability across these two groups can be attained.

5. Conclusions

This study has provided the first evidence for the efficacy of utilizing the CSM to explore the interrelationships between health status, illness perceptions, coping strategies, and depression and anxiety in an IBD stoma cohort. Consistent with the CSM, health status directly influenced illness perceptions, which in turn, influenced coping (emotion-focused and maladaptive coping). Interestingly, months since surgery was found to influence illness perceptions and emotion-focused coping directly, but not health status. While depression was influenced by illness perceptions, emotion-focused coping and maladaptive coping, anger was only influenced by illness perceptions and maladaptive coping. Overall, these preliminary results provide further evidence for the complex interplay between psychological processes. Our findings are consistent with previous research\textsuperscript{52} that suggests in terms of directions for psychological interventions, a focus on identifying and working with illness perceptions is important.

Conflict of interest

There is no conflict of interest relating to the employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding.

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inflammatory bowel disease: Adjustment in relation to psychological comorbidity.