

# The influence of bowel dysfunction and depression on illness intrusiveness in multiple sclerosis using a moderation model

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## Abstract

Multiple sclerosis (MS) is an autoimmune disorder affecting the central nervous system. Bowel dysfunction can occur, with constipation and fecal incontinence as the two most frequently reported issues, with the prevalence rates at 35-54% and 29-51%, respectively. Both gastrointestinal issues can cause physical and social problems, thus potentially affecting MS patients' quality of life (QoL). One way of measuring QoL in MS is with the Illness Intrusiveness Ratings Scale (IIRS), a 13-item questionnaire that measures several different domains, including relationships and instrumental tasks of daily living. We hypothesize that by using depression, as measured by the Beck Depression Scale (BDI), as a moderator, bowel dysfunction, as measured by the Incapacity Status Scale (ISS), will be related to perceived illness intrusiveness. Participants' ( $N = 213$ ) bowel dysfunction ranges from severe to none, with the majority having mild to none. Using Hayes' PROCESS Conceptual Model 1, the model is significant ( $p < .0005$ ), as is the relationship between illness intrusiveness and depression ( $p < .0005$ ). The relationship between bowel dysfunction and illness intrusiveness is not significant ( $p = 0.1237$ ), and the relationship between illness intrusiveness and the interaction of bowel dysfunction and depression is nearly significant ( $p = 0.0514$ ), suggesting a trend. As our participants have more mild bowel dysfunction, we hypothesize that MS patients with more severe bowel dysfunction may report higher levels of illness intrusiveness.

## Introduction

MS is a demyelinating autoimmune disease, which affects the central nervous system. Bowel dysfunction is a common and disruptive complication of MS, with constipation (35-54% prevalence) and fecal incontinence (29-51% prevalence) being the most frequently reported issues (DasGupta & Fowler, 2003).

Patients with bowel dysfunction may feel embarrassed by their symptoms, and may not tell their healthcare provider (Gulick & Namey, 2012).

Bowel dysfunction can have a significant impact on a patient's QoL, causing problems with physical functioning, work, family relationships, and social activities, and may also cause emotional distress such as depression (Norton & Chelvanayagam, 2010; Gulick & Namey, 2012).

A determinant of QoL used with patients with chronic illness such as MS is the IIRS, which measures overall perceived illness intrusiveness, and the intrusiveness of the disease in different domains, such as relationships and activities of daily living.

We hypothesize that bowel dysfunction will be a predictor of illness intrusiveness, with depression moderating the relationship.

## Methods

Chart review of 213 participants from Holy Name Medical Center who signed research consent forms. The majority of participants were women ( $N = 161$ ) in middle adulthood ( $M = 48.39$ ,  $SD = 11.28$ ) with an average of 14.66 ( $SD = 2.46$ ) years of education.

Statistics: moderation analysis using Hayes' PROCESS Conceptual Model 1 in SPSS, with the bowel dysfunction question of the ISS as the independent variable (IV), the total score of the BDI as the moderator, and IIRS total score and subscales (Relationships and Personal Development, Intimacy, and Instrumental) as the dependent variables (DV).

## Results

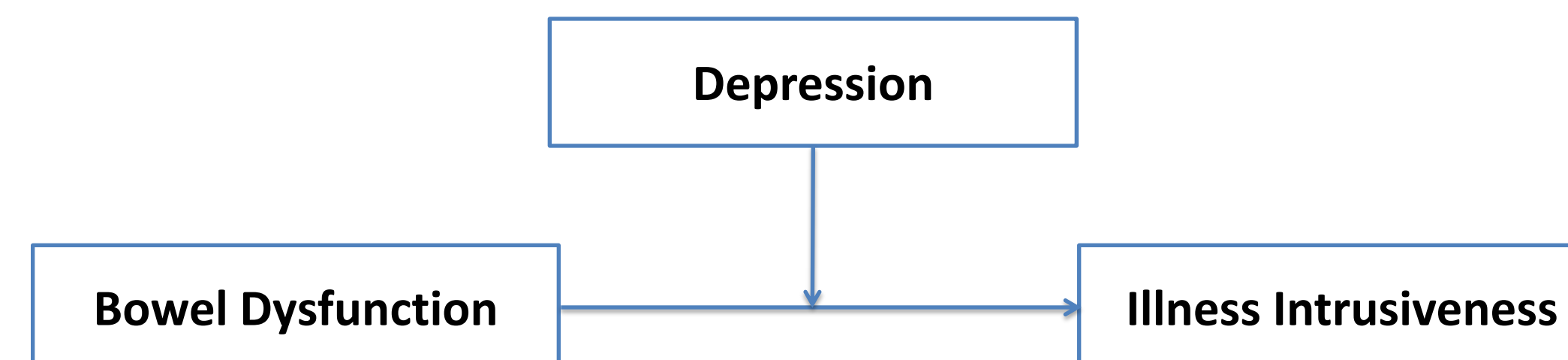


Table 1: Conceptual model of moderation, in which depression (moderator) explains when bowel dysfunction (IV) and illness intrusiveness (DV) are related

Participants' bowel dysfunction ranged from none (0) to severe (4), with most experiencing mild dysfunction. The mean BDI score was  $15.65 \pm 10.85$ , with scores ranging from 0 to 53. The mean IIRS total z-score was  $-0.06 \pm 1.04$ , with scores ranging from -1.71 to 2.30.

The model was significant with the IIRS total score as the DV,  $F(3, 209) = 45.17$ ,  $p < .005$ , as were the models using each of the three subscales ( $p < .0005$ ). The relationship between depression and illness intrusiveness was significant in all four models ( $p < .0005$ ).

The direct relationship between bowel dysfunction and illness intrusiveness was not significant with the total score ( $p = .1237$ ), Relationships and Personal Development ( $p = .3655$ ), Intimacy ( $p = .1346$ ), and Instrumental ( $p = .3137$ ) subscales.

The interaction between depression and bowel dysfunction was nearly significant with overall illness intrusiveness ( $p = .0514$ ). This trend was not observed with the Relationships and Personal Development ( $p = .3760$ ), Intimacy ( $p = .1709$ ), or Instrumental ( $p = .2030$ ) subscales.

## Discussion

There was a significant relationship between depression and illness intrusiveness, which has been noted previously in the literature (Snyder et al., 2013), but there was not a significant relationship between bowel dysfunction and illness intrusiveness.

When depression moderated the relationship between bowel dysfunction and illness intrusiveness, the near significant results with total illness intrusiveness ( $p = .0514$ ) suggests a trend. However, the moderated relationships with the different subscales of the IIRS as the outcome variables were not significant or near significant. This suggests that the interaction between bowel dysfunction and depression may affect overall perceived illness intrusiveness.

As a trend was noted between bowel dysfunction and depression, and depression had a significant relationship with illness intrusiveness, future research may investigate their interactions using a mediator model.

One of the major limitations of the study was the cohort had mainly mild bowel dysfunction. While near significance was found, it can be hypothesized that the relationship may be stronger with more severely impaired participants.

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