

Predictors of the Irritable Bowel Syndrome Severity in College Female Nursing Students with Irritable Bowel Syndrome

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Abstract. The aim of our study was to identify predictors of the irritable bowel severity in college female nursing students with irritable bowel syndrome (IBS). Our analysis was based on the data of 135 students, recruited from the six nursing colleges located in D city, Korea. Affective well-being and severity in IBS were assessed using structured questionnaires. Bivariate logistic analysis was used to identify predictors of severity in IBS. Among the participants, 48.9% had a positive screening for bowel symptoms on the Irritable Bowel Syndrome Severity Scoring system–Korean Version. Exercising four or more times per month, irregular meals and lower affective well-being were associated with a higher likelihood of moderate-to-severe IBS. Outcomes of our study provide a basis for designing interventions to assist female nursing students in managing and lowering the severity in IBS.

Keywords: Affective Well-being, College Students, Irritable Bowel Syndrome, Irritable Bowel Syndrome Severity, Nursing

1 Introduction

1.1 Background

Irritable bowel syndrome (IBS) refers to recurrent abdominal pain and altered bowel habits in the absence of an organic cause [1]. The prevalence of IBS in South Korea is estimated to be 2.2-9.6% among the general population [2], which is comparable to the prevalence of 5-12% reported in foreign countries [3]. The prevalence of IBS is 2-3 times higher in females than in males [1, 4]. Of concern is the estimated 28-33% prevalence of IBS among college female students in nursing programs [5, 6].

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Clinically, the severity of IBS is determined based on evaluation the following factors: frequency of abdominal pain, distension, bowel habits, and the effect of the symptoms on quality of life. According to the Irritable Bowel Syndrome Severity Scoring system–Korean Version (IBS-SSS), scores of 75-174 are indicative of mild IBS, 175-299 of moderate IBS, and 300-500 of severe IBS. In the absence of specific blood tests and pathological indices of IBS, and of the lack of a standardized evidence-based treatment, the severity of symptoms informs treatment planning and provides a measure of the effectiveness of interventions [7].

In their study on the risk factors for IBS in nurses, Liu et al. [8] reported physical activity, performed for 30 min, three or more times per week, to be effective in relieving abdominal distension and pain, thereby lowering the risk for developing IBS.

Costanian et al. [9] further reported the benefits of physical exercise on stress management, providing a further protective effect against IBS. By comparison, habits of skipping breakfast and irregular eating habits were identified as predisposing factors to the onset of IBS symptoms [10, 11]. Therefore, as physical exercise, dietary habits and affective factors impact on the development and Severity in IBS [12, 13].

Yet, current knowledge on best practice for therapeutic intervention is fragmented, with studies needed to further investigate the associations between irritable bowel syndrome severity, eating habits, exercise, and affective well-being.

Therefore, the general goal of our study was to evaluate the irritable bowel syndrome severity in college female nursing students with IBS, and to explore predictors of irritable bowel syndrome severity. Outcomes will form the basis for development of interventions to assist college female nursing programs in managing the irritable bowel syndrome severity and to prevent, as possible, the development of IBS.

1.2 Purposes

The specific aims of our study were to investigate differences in the general characteristics of female nursing students who have mild IBS, compared to students with moderate-to-severe IBS; differences in the affective well-being of students who have mild IBS, compared to students with moderate-to-severe; and to identify predictors of the severity in IBS.

2 Methods

2.1 Study Design and Participants

We conducted a descriptive study of second-year college female nursing students, recruited from six universities located in D city, South Korea. A self-report diagnostic survey, the Rome III Adult IBS questionnaire, was provided to 807 prospective students to identify students with mild-to-severe bowel symptoms associated to IBS. From this survey, 225 students were identified as meeting our inclusion criteria, with

140 of these students providing informed consent. The methods of our study were approved by our institutional review board of the Kyungpook National University (2015-0017).

2.2 Instruments

2.2.1. Rome III Adult Questionnaire: The Korean version of the Rome III Adult IBS Questionnaire, developed by Drossman et al. [14], was used for the identification of students with IBS. Translation of the questionnaire was provided by the Korean Society of Neurogastroenterology and Motility [15]. The Rome III Questionnaire uses the following questions to determine the severity of IBS symptoms: persistence of symptoms for 2-3 days/month in the previous 3 months (question 1), persistence of symptom over the non-menstrual period (question 2), and persistence of symptoms for ≥ 6 months (question 3). The criteria in questions 1-3 should be associated with two or more of the following: symptom relief with defecation (question 4); a change in stool frequency (questions 5-6); and change in symptoms accompanying change in the form (appearance) and hardness of stool (questions 7-8).

2.2.2. Affective Well-Being: Affective well-being was measured using the Korean version of the Psychological Well-being Measure Scale developed by Diener et al. [16] and translated by Woo and Yun [17]. This instrument measures subjective feelings of positive and negative emotions, using a 5-point Likert scale, with anchors at '1', 'very rarely or never felt', and '5'; 'very often or always felt'. Reverse coding was used for questions 2, 4, 6, 8, 9, and 11 of the scale, related to negative emotions, and the total score summed. The total score can vary between 12 and 60 points, with a higher score indicative of higher affective well-being. In a study by Diener et al. [16], a Cronbach's α of .81-.89 was calculated for the Well-being Measure Scale, with a Cronbach's α of .82 calculated for our study.

2.2.3. Irritable Bowel Syndrome Severity: The severity in IBS was measured using the Irritable Bowel Syndrome Severity Scoring system–Korean Version (IBS-SSS)[18]. This scoring system is comprised of questions regarding abdominal pain, abdominal distension, bowel habits, and the impact of IBS symptoms on quality of life. Each section is scored on a scale of 0-100 points, with the total score ranging between 0 and 500. The scores are sub classified as follows: a score of 75-174 is indicative of mild IBS; a score of 174-299 of moderate IBS; and a score of 300-500 of severe IBS [17]. In our study, we combined participants with moderate and severe scores into one group. Therefore, participants were classified into two groups for analysis: a group with a Mild IBSS and a group with a Moderate-to-severe IBS.

2.3 Data analysis

The general characteristics of the study group were described using frequency and percentage, except for the affective well-being score that was reported as a mean \pm

standard deviation (SD). Between-group differences in general characteristics were evaluated using chi-squared analysis and Fisher's exact test, with *t*-test used to compare affective well-being score. A bivariate logistic regression analysis was conducted to identify predictors of the severity of IBS. The adjusted odds ratio (AOR) was calculated for identified predictor variables. All data analyses were performed using IBM SPSS Statistics 20.0 program. A power analysis was calculated using G*Power 3.1. Based on the variability in scores of the measurement scales used, data from 119 individuals would be necessary for the bivariate logistic regression analysis to achieve an effect size of 0.15, a level of significance of 0.05, and a statistical power of the test of 0.95 for 3 independent variables. Assuming a 20% non-response rate, a total of 140 individuals were recruited. Review of questionnaires identified 5 questionnaires with incomplete responses; therefore, the data of 135 questionnaires was used in the analysis.

3 Results

The results of the bivariate logistic regression analysis, use to identify predictors of the severity in IBS, are presented in Table 3. The model fit was evaluated, with the chi-squared value of 45.901 and significance level of $p < .001$ being indicative of the goodness-of-fit of the model. The model identified exercise ≥ 4 times/month as a factor increasing the likelihood of moderate-to-severe IBS (AOR, 4.72; CI: 1.67-13.36). Irregular meals were associated with an increased likelihood of at least moderate IBS (AOR, 4.55; CI: 1.96-10.57). With regards to affective well-being, higher scores, indicative of higher well-being, were associated to a lower likelihood of moderate-to-severe IBS (AOR, .85; CI: .79-.92). Therefore, exercise frequency ≥ 4 times/month, irregular meals, and low level of affective well-being were predictive of a higher likelihood of moderate-to-severe IBS in college female nursing students.

Table 1. Predictors of the Irritable Bowel Syndrome Severity

| Predictor Variable | Adjusted Odds Ratio | 95% CI | | <i>p</i> |
|------------------------------------------|---------------------|--------|-------|----------|
| Exercise (Reference: none) | | | | |
| ≥ 4 times/month | 4.72 | 1.67 | 13.36 | .003 |
| 1-3 times/month | .62 | .23 | 1.66 | .351 |
| Regularity of meals (Reference: regular) | | | | |
| Irregular | 4.55 | 1.96 | 10.57 | <.001 |
| Affective well-being | .85 | .79 | .92 | <.001 |

| | | | | |
|--------------------------------------------------------|-------|---------------------|--------|-------|
| Constant | 8.463 | 2.096 | 16.303 | <.001 |
| -2 Log likelihood | | 140.182 | | |
| χ^2 | | 46.901 ($p<.001$) | | |
| Cox & Snelle R ² /Nagelkerke R ² | | .293 /.391 | | |
| Predicted group membership | | 72.6 | | |

4 Conclusion

In this study, we provided evidence of an association between moderate-to-severe IBS in college female nursing students and greater amounts of exercise (≥ 4 sessions per month), irregular meals and low scores of affective well-being.

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