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Observational study

Associations between abdominal pain symptom dimensions and depression among adolescents

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HIGHLIGHTS

- Chronic abdominal pain (AP) was reported by 27% of adolescents.
- 8.2% met the Rome III Irritable Bowel Syndrome (IBS) criteria.
- Depression rate was more than doubled among AP and IBS cases.
- Depression was strongly associated with AP distribution and intensity, and co-morbid pain.
- Symptoms distinguishing IBS from other types of AP (e.g. diarrhea, constipation) were not independently related to depression.

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ABSTRACT

Background and aims: The prevalence of depression is increased among patients with abdominal pain (AP) and Irritable Bowel Syndrome (IBS), but little is known about this association among adolescents in the general population. Furthermore, there is considerable uncertainty about exactly which dimensions of AP and IBS are associated with depression.

The aims of this study were therefore: (a) to describe the prevalence of AP, IBS and depression in a representative sample of adolescents, (b) to analyze the association of AP and IBS with depression and lastly, (c) to analyze the relationship between depression and specific AP and IBS symptom dimensions, i.e. pain intensity, frequency, duration, and distribution, the presence of co-morbid non-abdominal pain, and the specific bowel systems distinguishing IBS from AP in general.

Materials and methods: Self-reported symptoms of AP (monthly or more frequent), IBS (Rome III 2006 criteria), co-morbid chronic pain and depression (The Short Mood and Feeling Questionnaire sum-score ≥11) were recorded among 961 adolescents (mean age 16.1 y and 48.8% girls), participating in a population based study in 2010–2011. Multiple logistic regression carried out to analyze the association of AP and IBS with depression, adjusting for sex, parental level of education (<college or ≥college) and co-morbid chronic pain. Among the AP cases, the association of different AP dimensions and of the specific bowel symptoms in IBS with depression were analyzed in a stepwise multiple logistic regression model.

Results: Monthly or more frequent AP was reported by 27% of the participants ($n = 259$) and 8.2% ($n = 77$) met the Rome III IBS criteria. The prevalence of depression was 11.5% (girls 15.9% and boys 7.3%). The prevalence of depression was higher among both AP and IBS cases compared to in controls (20.5%, 24.7% and 8.1% respectively), but there was no evidence that depression rates differed between the two case groups (IBS: OR = 2.5, 95% CI = 1.6–3.9; AP: OR = 2.4 with 95% CI = 1.3–4.4, after adjusting for sex, parental level of education and co-morbid chronic pain).

In the regression analyses within the AP group, the following symptom dimensions were independently associated with depression: severe abdominal pain intensity (OR = 4.0; CI = 1.5–10.7), widespread abdominal pain (OR = 5.5; CI = 2.6–11.8) and presence of co-morbid chronic pain (OR = 3.3; CI = 1.6–6.8). Sex, parental education, and other abdominal pain symptom dimensions, including bowel symptoms that distinguish IBS from AP, were not independently associated with depression.

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Conclusions and implications: The prevalence of depression is considerably increased among adolescents with AP and IBS in the general population, in particular among those reporting severe, widespread abdominal pain, and co-morbid chronic pain. Evaluating these symptom dimensions may be of value for identifying subgroups adolescents with AP and IBS that have greater risk of depression.

1. Introduction

Abdominal pain (AP) is a common, typically recurrent, complaint among adolescents and is frequently accompanied by mental health problems, reduced quality of life and interference with daily life activities [6,7,16,31,33,36–38,41]. AP or discomfort is the cardinal symptoms of Irritable Bowel Syndrome (IBS), symptoms that are associated with altered bowel habits [30]. IBS is the most common type of recurrent AP in children and adolescents [9,10,18].

Though the association of AP and depression is well established in the literature, there is considerable uncertainty about exactly which dimensions of AP are associated with depression. Chronic pain in general is described as a risk-factor for negative affective symptoms in childhood, adolescence and later in adulthood [4,21], but the relationship of these symptoms are complex, probably bi-directional [8,12,14] and with shared patho-physiological mechanisms [19,20,23,40]. Paediatric studies have to some extent described a positive association between symptom severity in AP and IBS and mental health problems, principally anxiety and depression [16,33,38,41]. However, little is known about the relationship between the specific symptom dimensions of AP and mental health, such as the intensity, duration and frequency of painful episodes, or whether the symptoms that are specific to IBS (e.g. change in stool frequency/consistency and relief with defecation) are related to mental health. Furthermore, is it unclear to what extent the presence of co-morbid pain symptoms among adolescents with AP and IBS is associated with increased risk of depression.

Based on current knowledge we aimed to test the hypothesis that the association between AP, IBS and depression was related to the severity of AP symptoms and the presence of co-morbid non-abdominal chronic pain. The main aim of this study was therefore to gain a more detailed understanding of the relationship between AP and IBS symptom dimensions, and affective symptoms among adolescents, thereby contributing knowledge that may help to identify individuals with AP and IBS with greater risk of depression. Increased awareness on affective symptoms in these individuals could consequently improve the management of AP and IBS.

2. Materials and methods

2.1. Sample

In September 2010 through June 2011 adolescents from the municipality of Tromsø in Northern Norway were invited to participate in a cross-sectional population based study that included all pupils in first-year high school (11th school year) in both academic and vocational educational programmes from all high schools in the study area. Each participant completed a comprehensive health questionnaire in the Department of Research at the University Hospital of North Norway.

A total of 1117 students from five high-schools were invited and of these 1038 students participated (participation rate = 92.9%). Participants that were 18 years or older ($n = 77$) were excluded from the analysis since this was a study of only adolescents, leaving a final sample of 469 girls and 492 boys, aged 15–17 years (mean = 16.1).

The study was approved by the Regional committee for medical and health research ethics in North Norway. Written informed consent from the participants was obtained prior to inclusion.

2.2. Measurement of depression

The Short Mood and Feeling Questionnaire (SMFQ) was used to measure depressed mood. SMFQ is a 13-item screening tool for depression, which has been validated in both clinical samples and in the general population [2,3]. The Norwegian translated full version of the Mood and Feeling Questionnaire (34 items) has been validated against other measures of depression [34] and the SMFQ has also been used in an previous Norwegian epidemiological studies of depression among adolescents [24]. SMFQ sum scores above $\geq$11 have a sensitivity of 0.86 and specificity of 0.87 for detecting clinical depression in adolescents [35]. Consequently, participants scoring above this cut-off were operationally defined as cases suffering from depression, but without subsequent clinical depression diagnostics. The SMFQ does not include questions about somatic symptoms or pain.

2.3. AP and IBS case definition

A broad definition of AP was used in order to include as many participants as possible, enabling further subgroup classification with respect to pain frequency and duration, and other dimensions of AP (see below for details). Therefore, participants reporting AP during the past two months that occurred at least once a month were defined as AP cases.

The revised Irritable Bowel Syndrome criteria from 2006 (Rome III IBS criteria) were used to identify participants with IBS symptoms [30]. Adolescents were classified as IBS cases if they reported weekly abdominal pain or discomfort during the past two or more months and two or more of the following associated bowel symptoms at least 25% of the time: (1) relief with defecation (2), change in stool frequency (3) and/or change in stool form.

Both the AP and IBS case definitions were solely based on self-reported symptoms, not including self-reported clinical diagnosis or medical diagnostic examinations. Adolescents who fulfilled neither AP nor IBS criteria were defined as controls in the statistical analyses.

2.4. AP symptom dimensions

AP cases were further sub-classified along the following symptom dimensions: (1) how long they had abdominal pain; (2) how often they experienced abdominal pain or discomfort; (3) how long each painful episode lasted; (4) whether their symptoms were limited to a single abdominal site (below, around or above the belly-button) or whether the symptoms were widespread and included two or all of these sites; and (5) the average intensity of their abdominal pain, rated on a 0–10 numeric rating scale (NRS), with anchors “No pain” and “The most intense pain imaginable”. The AP intensity results were sub-classified as mild (NRS 1–3), moderate (NRS 4–6) and severe (NRS 7–10) due to the somewhat skewed distribution and few cases with the very lowest or highest ratings. Additional classification was made with respect to associated

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