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Original Article

# Depressive symptoms in children with chronic gastrointestinal disorders

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**Abstract** ***Background***: Children with chronic illness may have depressive symptoms. The purpose of this study was to determine the prevalence of depressive symptoms among children attending a pediatric gastroenterology outpatient clinic in Malaysia, and whether it differed by age, gender and diagnosis.

***Methods***: This was a cross-sectional study, with data collected over a 16 month period (April 2010–July 2011). Patients aged 7–17 years on follow up at the pediatric gastroenterology clinic at University Malaya Medical Centre, Kuala Lumpur, were recruited consecutively. They were classified into high, average and low scores based on responses to questions in the Children's Depression Inventory (CDI; high, T-score >55; average, T-score 45–55; low, T-score <45). Children with high scores were considered to have depressive symptoms.

***Results***: The response rate was 93%. One hundred children (44 boys; 56 girls) were studied. Major diagnoses were: functional abdominal pain ($n$ = 22), inflammatory bowel disease ($n$ = 26), biliary atresia ($n$ = 17) and miscellaneous gastrointestinal conditions ($n$ = 35). The overall prevalence of high CDI for depressive symptoms was 27.0%, while 43.0% and 30.0% had average and low scores, respectively. There were no significant differences in the prevalence of high scores among children with different diagnoses.

***Conclusions***: Depressive symptoms were common among children attending a pediatric gastroenterology clinic. It is important to recognize symptoms of depression in children with gastrointestinal disorders.

**Key words** Children's Depression Inventory, depression, gastrointestinal disorders, outpatient, pediatric.

The true prevalence of depressive symptoms is higher than the rate of detection in the pediatric population.[1] It has been estimated that 2.0–5.0% of the general pediatric population suffer from depressive symptoms.[2,3]

Children with an underlying chronic illness are at greater risk of having depressive symptoms.[4] Depressive symptoms may exist even in the absence of overt clinical depression, because most of these children are not clinically depressed.[4]

The aim of the present study was to ascertain the prevalence of depressive symptoms among children attending a pediatric gastroenterology outpatient clinic in a tertiary hospital in Malaysia, and to elucidate associated risk factors for harboring depressive symptoms. In addition, the prevalence of depressive symptoms among patients with functional abdominal pain (FAP), inflammatory bowel disease (IBD) and biliary atresia (BA), the three most common underlying diagnoses among children who attended the outpatient clinic, was compared.

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## Methods

This was a cross-sectional study, conducted at the Department of Paediatrics, University Malaya Medical Centre (UMMC), Kuala Lumpur. Data were collected over a period of 16 months (1 April 2010–31 July 2011). Approval from the Medical Ethics Committee of UMMC was obtained. The study participants were children attending the pediatric gastroenterology follow-up outpatient clinic at UMMC. Only children aged 7–17 years were recruited. All consecutive clinic patients who fulfilled the selection criteria were approached for recruitment. There was a response rate of 93% (100/107). UMMC is a tertiary referral center for children with gastrointestinal (GI) and liver disease in Malaysia.

Children attending the pediatric GI clinic were recruited after written informed consent was obtained from a parent. Patient anonymity was maintained. Exclusion criteria were: developmental delay and learning disabilities, including reading disorder.

Patients were required to complete a validated Malay language version of the original 27-item Children's Depression Inventory (CDI) questionnaire by Kovacs.[5] The CDI is widely used for juvenile depression.[6] The Malay language version was validated by Rosliwati *et al*. in a 2008 study conducted among pediatric outpatients in Kota Bharu, Kelantan, on the east coast of Peninsula Malaysia.[7]

**Table 1** Total CDI T-score vs age

| Category | T-score, *n* (%) | | | Total |
|---|---|---|---|---|
| | High (>55) | Moderate (45–50) | Low (<45) | |
| All | 27 (27.0) | 43 (43.0) | 30 (30.0) | 100 (100.0) |
| Age (years)* | | | | |
| 7–12 | 14 (28.6) | 17 (34.7) | 18 (36.7) | 49 (100.0) |
| 13–17 | 13 (25.5) | 26 (51.0) | 12 (23.5) | 51 (100.0) |

*$P = 0.21$. CDI, Children's Depression Inventory.

Each participant answered by choosing one of three responses he/she considered to be the most accurate as an indicator of his/her feelings over the previous 2 weeks. A total score was obtained by adding up the participant's answers to all items. The questions encompassed negative mood, interpersonal problems, ineffectiveness, anhedonia and negative self-esteem. Subjects were classified into those with high, average and low scores based on their responses to questions in the CDI (high, T-score >55; average, T-score 45–55; low, T-score <45). T-score is based on a normative sample and calculated based on age (7–12 years and 13–17 years) and gender. In the present study, children with a high score were considered to have depressive symptoms. Those with an average score have an equal risk of depressive symptoms as the normal population, whereas those with a low score are at a lower risk than average for depressive symptoms.

To prevent inter-observer bias, the CDI questionnaire was completed by all subjects in the presence of the same researcher (S.J.). Another questionnaire pertaining to sociodemographic and illness-related information was filled in by the subject's parents.

The sample size was calculated based on a study by Szigethy *et al*. involving children with IBD attending a pediatric gastroenterology clinic.[8] In that study, a total of 24.5% of participants had a high score. Using a 10.0% margin of error, the required sample size was 75. With this information, an additional 25.0% of study participants were enrolled. Thus, 100 subjects were recruited. The data were analyzed using SPSS version 20.0 (IBM, Chicago, IL, USA).

## Results

One hundred participants who fulfilled the inclusion criteria were studied. Of these, 56 (56.0%) were female and 44 (44.0%) were male. Forty-nine children (49.0%) were aged 7–12 years and another 51 (51.0%) were aged between 13 and 17 years old. The ethnic distribution was as follows: Malay, $n = 30$; Chinese, $n = 41$; Indian, $n = 27$; Caucasian, $n = 2$. This reflects the ethnicity of the pediatric population utilizing the pediatric GI services of UMMC.

The overall prevalence of depressive symptoms (CDI T-score >55) was 27.0%. The majority (43.0%) had a moderate score, while 30.0% had a low score (Table 1). For the five standard subscales of the CDI, ineffectiveness was present in 34.0%, anhedonia in 30.0%, interpersonal problems in 27.0%, negative self-esteem in 18.0% and negative mood in 17.0%.

The distribution of scores by age group is given in Table 1. There were no significant differences between subjects aged 7–12 years and those aged 13–17 years in the level of depressive symptomatology ($P = 0.21$). Similarly, there was no significant difference between the scores of the age–gender groups ($P = 0.25$).

The study participants were categorized into four groups. These were: FAP ($n = 22$), IBD ($n = 26$), BA ($n = 17$) and other GI diagnoses ($n = 35$). The reason for this classification was that FAP, IBD and BA were the three largest groups of patients under follow up at UMMC. For management purposes, it was important to determine whether any of these groups were at a higher risk of having depressive symptoms. The "others" group consisted of miscellaneous GI diagnoses (Table 2).

Table 2 lists the distribution of participants according to diagnosis and duration of illness since diagnosis. There were 11 boys and 11 girls in the FAP group, and participants were 7–15 years of age (school grades 1–9). The IBD group consisted of 14 boys and 12 girls between the ages of 7 and 17 (grades 1–11). There were five boys and 12 girls aged 7–17 years in the BA group. As for the "others" group, there were 14 boys and 21 girls between the ages of 7 and 15 (grades 1–9).

For all the groups, disease activity was stable. No significant difference in the distribution of scores among the different diagnostic groups was noted (Table 3).

**Table 2** Diagnosis and duration of illness

| Diagnosis | *n* | Duration of illness (years) | | |
|---|---|---|---|---|
| | | <1 | 1–5 | >5 |
| Functional abdominal pain | 22 | 5 | 16 | 1 |
| Inflammatory bowel disease | 26 | 3 | 14 | 9 |
| Biliary atresia | 17 | 0 | 0 | 17 |
| Others | | | | |
| Alagille syndrome | 1 | 0 | 0 | 1 |
| Autoimmune hepatitis | 4 | 0 | 0 | 4 |
| Autoimmune sclerosing cholangitis | 1 | 0 | 0 | 1 |
| Blue nevus syndrome | 1 | 0 | 0 | 1 |
| Caroli disease | 1 | 0 | 1 | 0 |
| Cryptogenic liver disease | 1 | 0 | 0 | 1 |
| Cyclical vomiting | 1 | 0 | 0 | 1 |
| Glycogen storage disease | 3 | 0 | 0 | 3 |
| Intestinal lymphangiectasia | 1 | 0 | 0 | 1 |
| Juvenile hamartomatous polyps | 2 | 0 | 0 | 2 |
| Malabsorption | 5 | 1 | 2 | 2 |
| Peutz–Jegher syndrome | 2 | 0 | 1 | 1 |
| Post-enteropathy syndrome | 1 | 1 | 0 | 0 |
| Villous atrophy | 1 | 0 | 0 | 1 |
| Viral hepatitis | 7 | 0 | 3 | 4 |
| Wilson disease | 3 | 3 | 0 | 0 |
| Total | 100 | 13 | 37 | 50 |

**Table 3** CDI T-score vs diagnosis

| Diagnosis | Total CDI T-score, *n* (%) | | | Total |
|---|---|---|---|---|
| | High | Moderate | Low | |
| Functional abdominal pain | 11 (50.0) | 6 (27.3) | 5 (22.7) | 22 (100.0) |
| Inflammatory bowel disease | 6 (23.1) | 12 (46.2) | 8 (30.8) | 26 (100.0) |
| Biliary atresia | 4 (23.5) | 7 (41.2) | 6 (35.3) | 17 (100.0) |
| Others | 6 (17.1) | 18 (51.4) | 11 (31.4) | 35 (100.0) |
| Total | 27 (27.0) | 43 (43.0) | 30 (30.0) | 100 (100.0) |

FAP vs IBD, $P = 0.05$; FAP vs BA, $P = 0.09$; IBD vs BA, $P = 0.63$. BA, biliary atresia; CDI, Children's Depression Inventory; FAP, functional abdominal pain; IBD, inflammatory bowel disease.

The degree of depressive symptoms for each risk factor is shown in Tables 4,5. None of these risk factors was significant.

## Discussion

The aim of this study was to ascertain the prevalence of depressive symptoms among children attending a pediatric gastroenterology outpatient clinic. The main focus was on specific diseases: FAP, IBD and BA. The prevalence of depressive symptoms in this group of children was high: a total of 27.0% of children were reported to have significant depressive symptoms, but we did not find a significant difference between the prevalence of depressive symptoms among the FAP, IBD and BA groups.

Gold *et al*. noted a similar finding.[9] That study involved 62 patients with either IBD or functional GI (FGI) complaints attending a pediatric gastroenterology clinic. The researchers found that the patients' scores on standardized tests assessing depressive symptoms and behavioral problems were all not significant. They also found that the IBD group was less depressed than the FGI group. The reason for this was better professional support for the IBD patients.

In the present study there were no significant differences in the depressive symptoms among the different groups. A possible reason is that all of the study participants had been under follow up at the same pediatric gastroenterology unit and were monitored by the same team. Therefore, the professional support was similar regardless of the type of disease.

Children with FAP have no identifiable organic pathology. In several studies, a high likelihood of depressive symptoms was found among patients with FAP. The first was an American cross-sectional study of patients with frequent abdominal pain, aged 13–18 years of age.[10] In that study, the patients had a high risk of depressive symptoms.

Upon comparison of the FAP and IBD groups in the present study, more children with FAP had depressive symptoms, but this did not reach statistical significance. There were more children with FAP who had depressive symptoms than children with BA, but this finding also did not reach statistical significance. A possible explanation is the relatively low number of patients in each group of children with different diagnoses.

In the present study, 23.1% (6/26) of the patients with IBD had depressive symptoms (high CDI T-score). This proportion is consistent with the findings of Szigethy *et al*. of 24.5%.[8] The present findings, however, differ from the majority of studies in which patients with IBD have a higher likelihood of depressive symptoms when compared to other gastroenterological diagnoses. In a meta-analysis of the psychological adjustment of pediatric

**Table 4** Degree of depressive symptoms vs illness- and death-related variables

| Risk factor | | Degree of depressive symptoms, *n* (%) | | *P* |
|---|---|---|---|---|
| | | High ($n = 27$) | Moderate/low ($n = 73$) | |
| 1. | Death of a first-degree relative within the past year | | | 0.82 |
| | Yes | 3 (11.1) | 7 (9.6) | |
| | No | 24 (88.9) | 66 (90.4) | |
| 2. | Diagnosis of severe illness in a first-degree relative in the past year | | | 0.98 |
| | Yes | 4 (14.8) | 11 (15.1) | |
| | No | 23 (85.2) | 62 (84.9) | |
| 3. | Medical or psychiatric illness in the family | | | 0.47 |
| | Yes | 9 (33.3) | 19 (26.0) | |
| | No | 18 (66.7) | 54 (74.0) | |
| 4. | Presence of first-degree relatives with psychiatric illness | | | 0.54 |
| | Yes | 0 (0) | 1 (1.4) | |
| | No | 27 (100) | 72 (98.6) | |
| 5. | Presence of second-degree relatives with psychiatric illness | | | 0.39 |
| | Yes | 0 (0) | 2 (2.7) | |
| | No | 27 (100) | 71 (97.3) | |
| 6. | Limitation of physical activity due to illness | | | 0.68 |
| | Yes | 22 (81.5) | 62 (84.9) | |
| | No | 5 (18.5) | 11 (15.1) | |

**Table 5** Degree of depressive symptoms vs socioeconomic characteristics

| Risk factor | | Degree of depressive symptoms, *n* (%) | | *P* |
|---|---|---|---|---|
| | | High (*n* = 27) | Moderate/low (*n* = 73) | |
| 1. | Age category: | | | 0.73 |
| | 7–12 | 14/27 (51.9) | 35/73 (47.9) | |
| | 13–17 | 13/27 (48.1) | 38/73 (52.1) | |
| 2. | Gender | | | 0.08 |
| | Male | 8 (29.6) | 36 (49.3) | |
| | Female | 19 (70.4) | 37 (50.7) | |
| 3. | Existence of close friendship(s) | | | 0.80 |
| | Yes | 26 (96.3) | 71 (97.3) | |
| | No | 1 (3.7) | 2 (2.7) | |
| 4. | Marital status of parents | | | 0.06 |
| | Married | 23 (85.2) | 70 (95.9) | |
| | Not married | 4 (14.8) | 3 (4.1) | |
| 5. | Father's education level | | | 0.29 |
| | Tertiary | 9 (33.3) | 33 (45.2) | |
| | Non-tertiary | 18 (66.7) | 40 (54.8) | |
| 6. | Mother's education level | | | 0.08 |
| | Tertiary | 6 (22.2) | 30 (41.1) | |
| | Non-tertiary | 21 (77.8) | 43 (58.9) | |
| 7. | Father's occupational grade | | | 0.18 |
| | Professional | 3 (11.1) | 17 (23.3) | |
| | Non-professional | 24 (88.9) | 56 (76.7) | |
| 8. | Mother's occupational grade | | | 0.93 |
| | Professional | 1 (3.7) | 3 (4.1) | |
| | Non-professional | 26 (96.3) | 70 (95.9) | |
| 9. | Loss of family income within past year | | | 0.43 |
| | Yes | 5 (18.5) | 9 (12.3) | |
| | No | 22 (81.5) | 64 (87.7) | |
| 10. | Change of address within past year | | | 0.65 |
| | Yes | 3 (11.1) | 6 (8.2) | |
| | No | 24 (88.9) | 67 (91.8) | |

patients to chronic disease, IBD was the single disease with the most profound effect on mental health status of children.[11] A similar finding was noted in another study comparing the mental health and psychological functioning of children with IBD, children with other chronic illnesses, and healthy controls. Psychiatric disorders were reported in 60.0% of children with IBD, followed by 30.0% of those with tension headache, and 15.0% of healthy controls.[12] One possible reason for the different findings in the present study is the adequacy of specialized professional support as well as the small number of patients with IBD.

In the present study, 23.5% of BA patients had depressive symptoms. This was similar to the 23.1% prevalence within the IBD group. There is currently a paucity of available data regarding depressive symptoms among pediatric patients with BA. It is hoped that the present findings can contribute to this data.

Adlina *et al*. found that children with more depressive symptoms were likely to be girls, to have more siblings and to have parents with no formal education or only primary school education.[13] In the present study, these were not significant factors.

There are several studies that explored depressive symptoms among pediatric patients with non-GI chronic disease.[14,15] Shatla *et al*. studied 23 children with epilepsy who were between the ages of 9 and 12 years.[14] A CDI T-score of >50 was taken as the cut-off for the presence of depressive symptoms. Two out of 23 (8.0%) had depressive symptoms. In the present study, a cut-off of >55 was used and 27.0% had depressive symptoms. Thus, the prevalence of depressive symptoms was higher in the present subjects, possibly due to an overall higher prevalence among pediatric gastroenterology patients.

In another study, total CDI score for 37 Korean children, aged 6–17 years, with type 1 diabetes mellitus was compared with that of healthy controls.[15] CDI score was significantly higher in the type 1 diabetes mellitus group ($P < 0.05$). As in the present study, CDI has been utilized for detection of depressive symptoms among pediatric patients with chronic illness.

The present study affirms the importance of recognizing the presence of depressive symptoms among pediatric gastroenterology outpatients. The recognition of these symptoms enables early intervention when required.

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