



# Encopresis in Children: Psychological Assessment and Evaluation of Behavioral Training Program

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## Authors' contributions

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## ABSTRACT

**Background:** Encopresis (fecal incontinence) is a disorder which affects children worldwide. It is even more stigmatized than enuresis and urinary incontinence and is associated with high levels of distress for both children and parents. The aim of the psychological work is assessing of patients with Functional fecal incontinence and assessment of the effectiveness of behavioral training program for the patients and their parents.

**Methods:** This comparative cohort study was carried out at the Neuropsychiatry Department, Tanta University and Centre of Psychiatry, Neurology and Neurosurgery-Tanta University hospitals and pediatric surgery outpatient clinic of Tanta University Hospitals. Inclusions criteria were age group more than 4 years to 18 years, Both males and females and all patients with a diagnosis of functional encopresis. The study was performed on two groups: Group (A): include 30 patients

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diagnosed with functional encopresis (is defined as both voluntary and involuntary passage of feces in inappropriate places in a child aged four years or older, after organic causes have been ruled out), receiving a behavioral training program and medication for 6 months. Group (B): include 30 patients diagnosed with functional encopresis receiving medical treatment only for 6 months.

**Results:** There were clinically significant differences between the studied groups regarding behavior problem outcome at the end of treatment according to Revised Behavior Problem Checklist outcome p values were (0.001). There were no clinically significant differences between the two studied groups regarding depression outcome at the base line and at the end of treatment according to The Children's Depression inventory. There were no clinically significant differences between the studied groups regarding quality-of-life outcome at the base line and at the end of treatment according to WHO quality of life scale domains p value 0.001. Regarding comorbidity with other psychiatric disorders, the most comorbid disorder in group (A) is ADHD which represented 53.3% followed by enuresis 50% while the most comorbid disorder in group (B) is enuresis 43% followed by ADHD 40%. Additionally, there was negative correlation between total behavior score and social class of the patients of group (A) with statistically significant difference p value = 0.001 i.e., the higher the social class, the lower the total behavior scores.

**Conclusions:** Encopresis is associated with many behaviors problem, depressive symptom and has low quality of life. Encopresis is associated mainly with ADHD, enuresis and anxiety disorder. Quality of life in children with encopresis is improved after administration of treatment specially in group A (receiving medical and behavior treatment).

**Keywords:** *Encopresis; anxiety; Psychological assessment; neuropsychiatry; behavior problem; depressive symptom.*

## 1. INTRODUCTION

“Encopresis is a disorder which affects children worldwide. It is even more stigmatized than enuresis and urinary incontinence and is associated with high levels of distress for both children and parents. Also, the rate of comorbid emotional disorder is higher, affecting 30%-50% of all children with encopresis” [1]. “Faecal incontinence (FI) is a pediatric gastroenterological problem with profound personal and family impacts. The affected children present with a history of involuntary passage of stools into the underwear. The characteristic aroma of faeces in these children predisposes them to stigmatisation, rejection and bullying at school, which subsequently result in school avoidance and social withdrawal” [2].

“Biopsychosocial factors play a pivotal role in the onset and continuation of symptoms in children with FI (faecal incontinence), Two studies have identified low socioeconomic background as a risk factor for functional FI in children” [3].

“Inadequate toilet facilities and unclean or unhygienic toilets may be discouraging these children from using toilets, leading to stool withholding and retention. Delay in seeking health care for defecation disorders, psychological and behavioural abnormalities like

aggressive behaviour, social withdrawal, anxiety, depression, disruptive behaviour, and poor school and social performances were commonly noted in children with functional FI” [4].

“These children have a significantly lower quality of life and most of the time suffer silently Therefore, it is not surprising that they develop behavioural, emotional and upbringing problems, learning difficulties, depression and are also frequently subjected to maltreatment” [5].

“Analysis of child behavior checklist had shown that approximately one-third of children with functional non retentive Faecal incontinence had psychological disturbances and behavioural problems” [6].

The relationship between FI and its impact on quality of life (QOL) had been studied in the clinic but not in the community, 23% of the subjects with FI reported that the symptoms had a moderate to severe impact on one or more domains of QOL.

FI had “a lot of impact” on QOL in a UK-based study. “The impact on QOL was clearly related to severity of FI. Thus, 35% of patients with moderate FI and 52% with severe FI reported a moderate to severe impact on QOL” [7]. “There are strong emotional reactions to fecal soiling in

both parents and children. Parents fear that their child is lazy and doesn't want to take the time to go to the bathroom. Children with encopresis often claim that they don't know when they have to have a bowel movement and are then embarrassed by soiling. They may hide underwear in their room increasing the problem by creating a strong Odor in the house. They may withdraw from peer interactions because bullying. In some cases, large bowel movements may lead to clogging of the toilet" [8].

"Behavioural therapy (toilet training in combination with reward system and diminishing toilet phobia) in combination with cognitive therapy (psychotherapy, family therapy or educational support) aims to lower the distress, restore normal bowel habits by positive reinforcement and re-establish self-respect. the process also encourages both the child and the parents to continue treatment Behavioural therapy has shown to be effective in reducing episodes of FI, when combined with intense medical management" [7].

The current study will evaluate the efficacy of the behavioral training program in managing the functional Faecal incontinence among children.

The aim of the work is psychological assessment of patients with Functional fecal incontinence and the effectiveness of behavioral training program for the patients and their parents.

## 2. METHODOLOGY

This comparative cohort study was carried out at the Neuropsychiatry Department, Tanta University and Centre of Psychiatry, Neurology and Neurosurgery-Tanta University hospitals and pediatric surgery outpatient clinic of Tanta University Hospitals during the period from November 2018 to November 2019.

Inclusions criteria were age group more than 4 years to 18 years, Both males and females and all patients with a diagnosis of functional encopresis.

Exclusions criteria were patients with comorbid mental retardation and patients with encopresis due to general medical condition.

**Sample size:** The study was performed on two groups: **Group (A):** include 30 patients diagnosed with functional encopresis (is defined as both voluntary and involuntary passage of

feces in inappropriate places in a child aged four years or older, after organic causes have been ruled out), receiving a behavioral training program and medication for 6 months. **Group (B):** 30 patients diagnosed with functional encopresis receiving medical treatment only for 6 months.

### Study tools:

**All patients in the study were subjected to:** Full History Taking were first passage of meconium, early bowel habits, duration of constipation and encopresis, and possible relating initiating factors, previous treatment, duration & compliance.

Examination of the patient were abdominal examination, examination of the spine to exclude spina bifida, per rectal (P R) Examination, and neurological examination.

**Investigations to exclude organic causes of encopresis were:** Contrast enema, Plain X Ray. Other investigations as required in selected cases like: Ano-rectal manometry, colonic, transit study, anal endo sonography will be done.

### Psychiatric assessment:

**Socio – demographic evaluation:** Age, sex, educational level of the parents was classified to illiterate or primary school education, secondary education and university education or higher, Residence.

Socio economic status of the family was conducted according to the Egyptian classification of [9]. This scale based on 5 parameters: education of the father, education of the mother, income, crowding index and sanitation.

The parameter yields a total score: Score of 25 - 30 is considered high social class, Score of 20 - 25 is considered middle social class, Score of 15 - 20 is considered low social class, Score of 14 or lower is considered very low social class, and type of family whether nuclear or extended family.

Nuclear family (married couple and their children).

Extended family (a family group that consists of parents, children, and other close relatives, often living in proximity). Stanford-Binet Intelligence quotient (I.Q) fourth edition [10], we used Arabic translated and validated version [11].

It is used to exclude patients with I.Q < 80. It is an individually administered intelligence test that was revised from the original Binet– Simon scale. It is a cognitive ability and intelligence test that is used to diagnose developmental or intellectual deficiencies in young children. It consists of both verbal and nonverbal subtests. Factors being tested are knowledge, reasoning, visual-spatial processing, working memory. This score was calculated by dividing the mental age by chronological age, and then multiplying this number by 100.

**WHO quality of life scale (WHOQOL-BREF):**

The World Health Organization Quality of Life–BREF (WHOQOL-BREF) is a self-report questionnaire which assesses 4 domains of quality of life (QOL): physical health, psychological health, social relationships, and environment. In addition, there are 2 items that measure overall QOL and general health. The assessment conceptually fits with the WHO definition of QOL. WHOQOL-BREF can provide data for both research and clinical purposes. Although it is a relatively brief instrument, its structure allows one to acquire specific information covering many aspects of life. It takes 10-15 minutes, 26 items.

**Subscales (domains):** Physical Health (7 items), Psychological Health (6 items), Social Relationships (3 items).

Environment (8 items) m D.

(K-SADS-PL) Kiddie schedule for affective disorders and schizophrenia for school-age children (6-18 Years) -present and lifetime [12]. we used Arabic translated and validated version [13].

It is a semi-structured diagnostic interview used to screen for affective and psychotic disorders as well as other disorders including Major Depressive Disorder, Mania, Bipolar Disorders, Schizophrenia, Schizoaffective Disorder, Generalized Anxiety, Obsessive Compulsive Disorder, Attention Deficit Hyperactivity Disorder, Conduct Disorder, Anorexia Nervosa, Bulimia, and Post-Traumatic Stress Disorder. This semi-structured interview takes 45–75 minutes to administer. Most items in the K-SADS-PL are scored using a 0–3 point rating scale. Scores of 0 indicate no information is available; scores of 1 suggest the symptom is not present; scores of 2 indicate sub-threshold presentation and scores of

3 indicate threshold presentation of symptoms. The KSADS-PL has six components:

**Unstructured Introductory Interview – Developmental History:**

The first part of the interview asks about developmental history and the history of the presenting problem. The interviewer takes detailed notes on the record sheet. Prompts cover basic demographic information, physical and mental health history and prior treatments, current complaints, and the youth's relations with friends, family, school, and hobbies. This section allows flexibility for the interviewer to collect more information on questions that need elaboration.

**Diagnostic Screening Interview:**

The diagnostic screening interview reviews the most severe current and past symptoms. There are probes and scoring criteria for each symptom presented. Symptoms of disorders are grouped into modules. If the patient does not display any current or past symptoms for the screening questions, then the rest of the module's questions do not need to be asked.

**Completion Checklist Supplement:**

A supplemental checklist is used to screen for additional disorders.

Appropriate Diagnostic Supplements: These supplements review presence/absence of symptoms for other disorders, including anxiety disorders, behavioral disorders, and substance abuse. Summary Lifetime Diagnosis Checklist: Based on the previous sections, this section summarizes which disorders have been present from first episode to now.

**Children's Global Assessment Scale (C-GAS)**

Scores the child's level of functioning.

**The Children's Depression inventory (CDI)**

[14], we used Arabic translated and validated version [15]:

The Children's Depression inventory is a psychological assessment that rates the severity of symptoms related to depression or dysthymic disorder in children and adolescents. The CDI was developed by Maria Kovacs to diagnose depression more easily in children. It is a self-report assessment written at a first-grade reading level, which means that your child will be given

the paper and pencil assessment to complete by themselves.

The Children's Depression inventory the original 27-item version, which takes between 5 and 15 minutes for the child to complete. The CDI is designed to detect symptoms of depression and to distinguish between depression and other psychiatric disorders. It can also be used as an instrument to monitor changes in depression symptoms over time.

**Revised behaviour problem checklist (BPC) [16]** this well-known scale used in numerous studies is made of six subscales to diagnose and evaluate severity of six behavioral problems in children and adolescents. The scale is made of 89 items answered by the parent. It has six subscales for assessment of six problematic behaviors in children and adolescents which are:

Conduct disorder (22 items).  
Socialized aggression (18 items).  
Attention problems (15 items).  
Anxiety withdrawal (11 items).  
Psychotic behavior (6 items).  
Excess motor activity (5 items).  
12 nonspecific items.  
The parents answered by No=0 Sometimes=1 Always=2.

#### **Parenting Behaviours Scale"(PBS):**

This scale is originally designed by Dr. Amany Abd EL-Maksood, in Arabic for the Egyptian culture to assess the parent-adolescent or parent-child relationship from the point of view of the child so the scale introduced to the children to be answered. There are two forms of the scale (one form is for asking about father and the other one for asking about the mother.

The five areas of parenting assessed by this scale are:

**Discrimination:** (10 items) it means the parent(s) deal differently in a discriminative way with the child and his or her brothers and/ or sisters.

**Authorization:** (10 items) it means the parent(s) use dominance, high control, and low support (with punishment) in directing the child aiming to complete obedience from them.

**Inconsistency:** (10 items) it means the parent (s) lack consistency in standards (rules) addressed

to their child. In other words, breaking rules and morals put by parents i.e., ordering of something and then preventing it in another circumstances.

**Overprotection:** (10 items) it means the parent (s) do behaviors reflecting excessive concern for the safety and protection of the child and adolescent.

**Sound (Healthy /supportive):** (20 items) it means a collection of healthy behaviors lacking any abnormalities used by the parent (s) e.g., supporting, advising, participating in pleasurable activities, etc).

The scale is composed of 120 items (60 items for the mother and 60 items for the father) where No= 0 Yes=1. The normal parenting style is Sound (Healthy /supportive) type& abnormal types are (Discrimination, Authorization, Inconsistency, Overprotection).

**Medical treatment:** Disimpaction using either enema or laxatives& surgical evacuation in resistant cases.

**Maintenance therapy:** on laxatives to make the child passes at least one motion /day for the first three months and then the treatment withdrawn or modified according to the patient response.

**The patients were engaged in:** Behavioural training program for treatment of encopresis, in the first stage, assessment of the patient psychologically then applying the medical treatment and behavioural training program for at least six months to 12 months. Patient's management program will be reassessed psychologically again at the end of the program to assess its effectiveness.

**Designing management program:** this included the review of available programs and selection of items suitable to Egyptian culture.

#### **Behavioural Training Program**

##### **Session 1**

##### **Aim of the session**

**Providing parents informations about:** Essential of the program and goal setting

Importance of being aware of thought and its effect on emotion and behavior, as cognitive error of parent leads to punishment of child. Detecting importance of thought and its effect on emotion.

### **Therapist trains patient on detecting thoughts and write it in thought journal**

Parents write down notes and put stars then collecting it at evening every day as reward and positive reinforcement. Therapist train and provide information to parent about importance of medical treatment especially enema and how to make child relaxed during enema administration to relief pain.

**Relaxation technique:** Deep and slow inspiration and expiration will help relaxation of pelvic muscle during enema administration and rewarding child as positive reinforcement. Therapist requests that parent record number of soiling to detect progress before and after administration of program.

**Homework:** Filling form of thought journal.

Filling form of number of soiling.

#### **Session 2**

**Aim:** Revision of homework, Therapist training parent on relation between thought and emotion, Therapist provide information on how thought affects emotion and consequently behavior as written in journal of thought

#### **Homework**

- 1- Filling form of thought journal
- 2- Filling form of number of soiling
- 3- Follow up of child training on toilet

#### **Session 3**

**(Thought distraction):** Therapist trains parent on how thought distraction help them during dealing with child e.g. writing down negative thought and get it of.

#### **Homework**

- 1- Filling form of thought journal
- 2- Filling form of **Number of soiling**
- 3- Follow up of child training on toilet
- 4- Use technique of thought distraction

#### **Session 4**

##### **Aim**

Revision of previous instructions on the last sessions

Training parent on how to deal with negative thoughts.

Behavior analysis and dealing with thoughts.

#### **Behavior analysis**

Parent will set their priorities for behavior needed to be improved  
therapist will ask about antecedent and consequence of behavior

#### **Homework:**

- 1- Filling form of thought journal
- 2- Filling form of number of soiling
- 3- Follow up of child training on toilet
- 4- Use technique of thought distraction

#### **Session 5**

Summarize behavior and consequence to put strategy.

Modify antecedent to prevent behavior and consequences prevention replace bad behavior by healthy one.

#### **Homework:**

- 1- Filling form of thought journal
- 2-Filling form of number of soiling to detect progress
- 3-Follow up of child training on toilet
- 4-Use technique of thought distraction

#### **Session 6**

Revision on what has accomplished on previous session as regard behavior improvement and parents' feedback.

**Follow up session is done for at least six months.**

### **2.1 Statistical Analysis**

Statistical analysis was done by SPSS v25 (IBM Inc., Chicago, IL, USA). Quantitative variables were presented as mean and standard deviation (SD) and were compared by paired Student's t-test for the same group. Qualitative variables were presented as frequency and percentage (%). Evaluation of diagnostic performance sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV). Agreement: Measurements of TTE and EC were compared by paired Student's T test. Calculation

of Bias and its SD between TTE and EC were calculated. Modified Bland Altman plots of TTE and EC measurements were done A two tailed P value < 0.05 was considered significant.

### 3. RESULTS

This table is showing that there was no statistically significant difference between the studied groups regarding age (p value= 0.965), sex (p= 0.584), and educational levels of the parents (p= 0.705, 0.810). This table is showing that the majority (56.7%) of the group A and the group B (55%) were middle socioeconomic status, (26.7%) of the group A & (30%) of the group B were high socioeconomic status, (16.7%) of the group A & (13.3%) of the group B were low socioeconomic status, while (13.3%) of the group A and (10%) of the group B were very low socioeconomic status. There was no statistically significant difference (P=0.950) between both groups. The mean  $\pm$  SD of the intelligence quotient test in group A was (92.63  $\pm$  2.54) & the mean  $\pm$  SD of the intelligence quotient test in the group B was (92.60  $\pm$  2.49) with no clinically significant difference between the two groups p value was (0.959). The extended family represented (66.7%) of the group A and (73.3%) of the group B while nuclear family represented (33.3%) of the group A and (26.7%) of the group B with no clinically significant difference between the two groups p value (0.573). The rural residence represented 63.3% of group A and 53.3% of group B, while the urban residence represented 36.7% of group A and 46.7% of group B, with no clinically significant difference between the two groups p value (0.432). Normal parenting style represented 23.3% of group A and 16.7% of group B, while abnormal parenting style represented 76.7% of group A and 83.3% of group B with no clinically significant difference between the two groups (p value = 0.519). There were no clinically significant differences between the studied groups regarding behavior problem outcome at the baseline according to Revised Behavior Problem Checklist outcome. The best results had lower scores; this indicates that both groups had severe behavioral problems as they had high scores. There were clinically significant differences between the studied groups regarding behavior problem outcome at the end of treatment according to Revised Behavior Problem Checklist outcome. p values were (0.001). The patients of group (A) had lower scores than group (B) that indicate they had the best results Table 1.

There was clinically significant difference regarding behaviour problem outcomes pre & post treatment in group (A) p value (0.001\*). There was clinically significant difference regarding behaviour problems outcomes pre & post treatment in group (B) p value (0.001\*) Table 2.

The depression outcome at baseline in group A was (16.7%) and (13.3%) in group B, while the depression outcome at the end of treatment in group A was (6.7%) and (10%) in group B. There were no clinically significant differences between the two studied groups regarding depression outcome at the base line and at the end of treatment according to The Children's Depression inventory Table 3.

There were no clinically significant differences between the studied groups regarding quality-of-life outcome at the base line according to WHO quality of life scale domains (Physical, Psychological, Social relation, Environment). The best results had higher scores. There were clinically significant differences between the studied groups regarding quality-of-life outcome at the end of treatment according to WHO quality of life scale domains (Physical, Psychological, Social relation, Environment) p value 0.001. Group (A) patients had higher scores than group (B) that indicate group (A) had the best results Table 4.

This table is showing that there was comorbidity with other psychiatric disorders; the most comorbid disorder in group (A) is ADHD which represented 53.3% followed by enuresis 50%, anxiety 26.7%, ODD 26.7%, depression 16.7%, Bulimia & Conduct disorder 6.7%, OCD and Post traumatic stress disorder 3.3%. While the most comorbid disorder in group (B) is enuresis 43% followed by ADHD 40%, ODD 33.3%, anxiety disorder 20%, depression & conduct 13.3%, Anorexia nervosa & Bulimia 3.3%. There were no clinically significant differences between the two groups Table 5.

There were behavior problems in both types of families with no clinically significant difference between extended and nuclear families regarding total behavior problem outcome at the baseline. At the end of treatment, the scores of problem behavior outcome decreased in both types of families but more in the nuclear family with clinically significant difference between both groups p value 0.001 Table 6.

**Table 1. Comparison between the two studied groups according to demographic data**

Variables	Group(A) (n = 30)		Group (B) (n = 30)		P
	No.	%	No.	%	
<b>Age</b>					
Min. – Max.	4.0 – 18.0		4.0 – 18.0		<sup>t</sup> p= 0.965
Mean ± SD	7.06 ± 1.88		7.08 ± 1.64		
<b>Sex</b>					
Male	19	63.3	21	70.0	X <sup>2</sup> = 0.584
Female	11	36.7	9	30.0	
<b>Educational level of father</b>					
Illiterate or 1ry school	16	53.3	14	46.7	X <sup>2</sup> = 0.705
Secondary school	8	26.7	11	36.7	
University education	6	20	5	16.7	
<b>Educational level of mother</b>					
Illiterate or 1ry school	14	46.7	15	50	X <sup>2</sup> = 0.810
Secondary school	9	30	10	33.3	
University education	7	23.3	5	16.7	
<b>Social class</b>					
Very low	4	13.3	3	10	X <sup>2</sup> = 0.950
Low	5	16.7	4	13.3	
Middle	13	43.3	14	46.7	
High	8	26.7	9	30	
<b>Pre IQ</b>					
Variables	92.63 ± 2.54		92.60 ± 2.49		0.959
<b>Type of family</b>					
Extended	20	66.7	22	73.3	X <sup>2</sup> = 0.573
Nuclear	10	33.3	8	26.7	
<b>Residence</b>					
Rural	19	63.3	16	53.3	X <sup>2</sup> = 0.432
Urban	11	36.7	14	46.7	
<b>Parenting style</b>					
Normal	7	23.3	5	16.7	X <sup>2</sup> = 0.519
Abnormal	23	76.7	25	83.3	
<b>Total behavior problem outcome</b>					
<b>Baseline</b>	<b>Group(A) (n = 30)</b> 99.73 ± 8.76		<b>Group(B) (n = 30)</b> 98.77 ± 6.99		0.638
<b>Post</b>	<b>Group(A) (n = 30)</b> 65.93 ± 5.38		<b>Group(B)(n = 30)</b> 83.27 ± 6.51		0.001*

<sup>x2</sup>p: Value for Chi square test

<sup>FE</sup>p: Value for Fisher Exact for Chi square test

MC: Monte Carlo for Chi square test

<sup>t</sup>p: Value for Student t–test

**Table 2. Comparison between behavior problem outcomes pre& post treatment in group (A) and group (B)**

Total behavior problem outcome	Baseline (n = 30)	Post (n = 30)	P
Group (A)	99.73 ± 8.76	65.93 ± 5.38	0.001*
Total behavior problem outcome	Baseline (n = 30)	Post (n = 30)	P
Group (B)	98.77 ± 6.99	83.27 ± 6.51	0.001*



**Table 3. Comparison between the two studied groups regarding depression outcome at the base line and at the end of treatment according to The Children's Depression inventory**

Depression	Group(A) (n = 30)	Group(B) (n = 30)	P value
Baseline	5 (16.7%)	4 (13.3%)	0.718
Post	2 (6.7%)	3 (10%)	0.640
P value	0.228	0.688	

**Table 4. Comparison between the two studied groups regarding quality of life outcome at the base line according to WHO quality of life scale**

Pre	Group(A) (n = 30)	Group(B) (n = 30)	P
Physical	16.87 ± 2.64	16.83 ± 2.89	0.963
Psychological	14.70 ± 2.49	14.53 ± 2.57	0.800
Social relation	7.33 ± 2.26	7.00 ± 2.15	0.561
Environment	21.63 ± 5.76	20.63 ± 5.95	0.511
Quality total	60.53 ± 10.56	59.00 ± 10.61	0.577
Post	Group(A) (n = 30)	Group(B) (n = 30)	P
Physical	26.20 ± 3.18	20.33 ± 3.12	0.001*
Psychological	23.47 ± 3.04	17.60 ± 2.59	0.001*
Social relation	10.83 ± 1.95	8.50 ± 2.19	0.001*
Environment	31.10 ± 2.68	26.23 ± 5.32	0.001*
Quality total	91.60 ± 6.33	72.67 ± 8.70	0.001*

**Table 5. Comparison between the two studied groups according to (K-SADS-PL)**

KSAD	Group(A) (n = 30)		Group(B) (n = 30)		P value
	N	%	N	%	
Depression	5	16.7	4	13.3	0.718
Mania	0	0	0	0	-
Bipolar	0	0	0	0	-
Schizophrenia	0	0	0	0	-
Schizoaffective	0	0	0	0	-
Anxiety	8	26.7	6	20	0.542
OCD	1	3.3	2	6.7	0.554
ADHD	16	53.3	12	40	0.301
Conduct disorder	2	6.7	4	13.3	0.389
Anorexia nervosa	0	0	1	3.3	0.313
Bulimias	2	6.7	1	3.3	0.554
Post traumatic stress disorder	1	3.3	0	0	0.313
Enuresis	15	50.0	13	43.3	0.605
ODD	8	26.7	10	33.3	0.573

**Table 6. Comparison between behavior problem outcomes at the baseline and after in relation to type of family of patients of group (A)**

Baseline	Extended			Nuclear			p. value
	Mean	±	S. D	Mean	±	S. D	
Total behavior problem outcome	99.4	±	8.80	100.4	±	9.12	0.774
. Post	Extended			Nuclear			p. value
	Mean	±	S. D	Mean	±	S. D	
Total behavior problem outcome	68.3	±	3.61	61.2	±	5.33	0.001*

No clinically significant differences between behavior problems outcomes at the baseline in relation to educational level of the fathers of patients of group (A), p value > 0.001. At the end of treatment, the scores of revised behavior checklist were decreased that indicate improvement regarding behavior outcomes in relation to the educational level of the fathers of patients of group (A). The best results were found in the high education (university) Table 7.

There were no clinically significant differences between behavior problems outcomes at the baseline in relation to educational level of the mothers of patients of group (A), p value 0.993. At the end of treatment the scores of revised behavior checklist were decreased that indicate improvement regarding behavior outcomes in relation to the educational level of the mothers of patients of group (A). The best results were found in the high education (university) Table 8.

There were no clinically significant differences between problem behavior outcomes at the baseline in relation to social classes of patients

of group (A), p value > 0.001. At the end of treatment the scores of revised behavior checklist were decreased that indicate improvement regarding behavior outcomes in relation to the social classes of patients of group (A). The best results were found in high social classes Table 9.

There was negative correlation between the total behavior score and educational levels of the father of the patients of group (A) with statistically significant difference p value = 0.001 i.e. the higher the educational levels, the lower the total behavior scores (the best results). There was negative correlation between the total behavior score and educational levels of the mothers of the patients of group (A) with statistically significant difference p value = 0.001 i.e. the higher the educational levels, the lower the total behavior scores (the best results). There was negative correlation between the total behavior score and social class of the patients of group (A) with statistically significant difference p value = 0.001 i.e. the higher the social class, the lower the total behavior scores (the best results) Table 10.

**Table 7. Comparison between behavior problem outcomes at the baseline and at the end of treatment in relation to educational level of the fathers of patients of group (A)**

Baseline	Illiterate		Secondary		University		p. value
	Mean	± S. D	Mean	± S. D	Mean	± S. D	
Total behavior problem outcome	99.06	± 9.01	103.13	± 4.67	97.00	± 11.93	0.405
Post	Illiterate		Secondary		University		p. value
Total behavior problem outcomes	69.25	± 3.53	63.75	± 3.41	60.00	± 5.40	

**Table 8. Comparison between behavior problem outcomes at the baseline at the end of treatment in relation to educational level of the mothers of patients of group (A)**

Baseline	Illiterate		Secondary		University		p. value
	Mean	± S. D	Mean	± S. D	Mean	± S. D	
Total behavior problem outcomes	99.93	± 8.50	99.67	± 7.86	99.43	± 11.49	0.993
Post	Illiterate		Secondary		University		p. value
Total behavior problem outcomes	69.79	± 3.24	64.67	± 3.57	59.86	± 4.49	

**Table 9. Comparison between behavior problem outcomes in relation to social classes of the patients of group (A) at the baseline and at the end of treatment**

Baseline	Very low	Low	Middle	High	p. value
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	
Total behavior problem outcomes	96.25 ± 14.22	102.8 ± 2.77	99.00 ± 6.47	100.75 ± 11.8	0.717

After	Very low	Low	Middle	High	p. value
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	
Total behavior problem outcomes	72.75 ± 3.59	67.20 ± 5.45	66.62 ± 2.18	60.63 ± 5.34	0.001*

**Table 10. Correlation between total behavior score and educational levels of the fathers& mothers and social classes of the patients of group (A)**

	Total behavior score	
	R	P
Educational level of the Fathers	- 0.708	0.001*
Educational level of the Mothers	- 0.7756	0.001*
Social classes	- 0.672	0.001*

#### 4. DISCUSSION

In the present study, our age results were in line with [17] who reported that the prevalence of fecal incontinence is elevated among children over four years of age. Bongers and his colleagues, 2009 also found that “most children (77.2%) were between 8 to 12 years of age. In a study 95.65% (110 cases) were more than the age four years while only 4.35% (5 cases) were younger” [18].

As regards to sex, in the current study males represented most of the patients and control groups. Our results are consistent with Roberts and his colleagues, 2009 who stated that Encopresis was more frequent among boys [19].

We study the educational levels of the parents and their effects on the response of the children to treatment. Illiterate or 1ry School represented most of the educational level of the father. Parental education was reported both as a competence marker for toilet training and as a factor of protection against the stress of living in an underprivileged family. Our results were in line with Claudia and his colleagues, 2016 who reported that “children whose mothers had a high educational level reported a lower number of encopretic episodes per month” [20].

According to Fahmy and ElSherbini scale [9] in our study we noticed that the majority (43.3%) of the group (A) and the group (B) (46.7%) were middle socioeconomic status, (26.7%) of the group (A)& (30%) of the group B were high socioeconomic status, (16.7%) of the group A& (13.3%) of the group B were low socioeconomic status, while (13.3%) of the group A and (10%) of the group B were very low socioeconomic status.

The socioeconomic level is very important factor affecting fecal incontinence as economic drain on families, society, and health services. Direct costs involve expenses on extra washing and drying, extra bed linen and the child’s personal clothing, travel to consultations for treatment and the treatments themselves. Indirect costs involve time spent on extra housework and consultations, with a loss of productivity in the parent.

We noticed in our study that most families were extended family which represented with no clinically significant difference between the two groups. These findings may be due to extended families have more troubles, less organization and diffusion of the role of the caregiver.

We reported in our study that the rural residence represented most of both groups with no clinically significant difference between the two groups. These findings were contradictory to Claudia and his colleagues, 2016 who found that the patients’ geographic area of origin was predominantly urban.

We found in our study that normal parenting style represented 23.3% of group (A) and 16.7% of group (B), while abnormal parenting with no clinically significant difference between the two groups [20]. These findings were in line with Hunt and his colleagues, 2007 who reported that “risk factors for secondary elimination disorders include an exposure to four or more stressful life experiences in one year. Disruptive experiences such as parental separation and multiple residential moves were experienced by approximately half of the subjects and adjustment to new family structures by a third. Adverse experiences such as being regularly exposed to adults handling conflicts in their presence were experienced by almost half the subjects” [21].

“Reports on parenting style in children with encopresis, however, especially surveys of children on the parenting styles of their parents, are scarce; this may be because encopresis is generally a disorder of earlier childhood” [22]. Parental perceptions, attitudes, and reasons for seeking help have clinical significance. Practices such as punishment and regular laxative use may be the cause or effect in these conditions.

Our findings were in line with *Schonwald and his colleagues, 2004* who reported that “thirty percent of parents/caregivers have resorted to punitive means to cope with these conditions”. They perceive the child's behavior to be intentional ‘naughtiness’ or as a sign of ‘laziness’ to use the bathroom. “Parental intolerance and resulting non accidental injuries to the child have been linked to increased rates of encopresis” [23].

Our study reported that there were no clinically significant differences between the studied groups regarding behavior problems outcome at the baseline according to Revised Behavior Problem Checklist parameters (Attention, Anxiety, Conduct, motor, psychotic, social). The best results had lower scores; this indicates that both groups had severe behavioral problems as they had high scores.

These results agreed with Levine and his colleagues, 1980 found that children with fecal incontinence were more socially withdrawn and had affective changes when compared to a control group. Relief of fecal incontinence after treatment was associated with a generalized improvement in behavioral profiles [3]. Similarly, Young and his colleagues, 1995 found a decrease in behavioral problems and an improvement in the social competence of children with successful treatment of fecal incontinence [24].

One study assessed behavioral profiles in children with fecal incontinence by Van der Plas and his colleagues, 1996. Initially abnormal behavioral scores were observed in 35% of these children. Successful treatment was associated with an improvement in behavioral scores. These studies support the idea that fecal incontinence plays an etiological role in the occurrence and maintenance of behavioral problems and cannot be primarily classified as a psychiatric disorder. This underscores the assumption that the initial treatment of children with fecal incontinence can be made in a pediatric clinic [25].

In contrast to Olaru and his colleagues, 2016 who found that the most frequent changes encountered in the study included emotional distress, anxiety, and social adjustment difficulties. There was a high rate of somatization and behavioral disorders in our group and their composition was largely heterogeneous [20].

In comparison between the two studied groups regarding problem behavior outcome at the end of treatment according to Revised Behavior Problem Checklist; the total behavior problem outcome scores decrease in group (A) more than group (B) with clinically significant difference between the both groups. These findings clarified that the group who received behavioral therapy with the medical treatment improved regarding to the behavioral problem outcome more than the other group who received medical treatment only.

In our study we found that the depression outcome at baseline in group (A) was (16.7%) and (13.3%) in group B, while the depression outcome at the end of treatment in group A was (6.7%) and (10%) in group (B) according to The Children's Depression inventory. These results were in line with Cox and his colleagues, 2002 who reported that Children with encopresis were found to have more anxiety/depression symptoms, family environments with less expressiveness and poorer organization, more attention difficulties, greater social problems, more disruptive behavior, and poorer school performance [26].

These findings were also supported by Benninga and his colleagues, 2004; Joinson and his colleagues, 2006 who found that parents of children with encopresis reported higher rates of internalizing problems such as anxiety and depression symptoms in children with fecal incontinence.

We reported that there were no clinically significant differences between the studied groups regarding quality-of-life outcome at the base line according to WHO quality of life scale domains (Physical, Psychological, Social relation, environment). The best results had higher scores that were presented in the group (A). While we found that there were clinically significant differences between the studied groups regarding quality-of-life outcome at the end of treatment according to WHO quality of life scale domains (Physical, Psychological, Social relation, Environment) [27,28].

Patients of group (A) who received a behavioral training program and medical medication had higher scores than patients of group (B) who received medical treatment only that indicate group (A) had the best results. Our results were in line with Bongers and his colleagues, 2006 who found that parents reported lower QoL regarding both physical and psychosocial functioning, and general health and behavior aspects in their children with functional defecation disorders compared with healthy children [29].

Regarding to (K-SADS-PL) we found that there was comorbidity with other psychiatric disorders; the most comorbid disorder in group (A) is ADHD which represented 53.3%. For ADHD children, it was proposed that, because they suffer from attention problems and impulsivity, they may not recognize internal cues associated with bowel movements, and thus they may not spend enough time in the bathroom to empty their bowels. They would hold stool in their bowel, resulting in constipation and, consequently, encopresis [30]. These findings were in line with Johanson and his colleagues, 2007 who attributed this to the child with ADHD displays task impersistence, having difficulty in sitting still to complete tasks [31].

Followed by enuresis 50%, anxiety 26.7%, ODD 26.7%, depression 16.7%, Bulimia& Conduct disorder 6.7%, OCD and Post traumatic stress disorder 3.3%. While the most comorbid disorder in group (B) is enuresis 43% followed by ADHD 40%, ODD 33.3%, anxiety disorder 20%, depression& conduct 13.3%, Anorexia nervosa& Bulimia 3.3%. There were no clinically significant differences between the two groups.

Our results were in line with Van der Plas and his colleagues, 1996 who reported behavioral problems, mostly internalizing problems, in a subgroup of 35% of children with non-retentive fecal incontinence by using the Child Behavior Checklist. Studies showed that children with encopresis may have various comorbid disorders. Within these disorders, enuresis, ODD, and ADHD most commonly accompany encopresis. The point prevalence of pediatric depressive disorders in the normal population is estimated to be 1-2%, whereas the ratio is 5-10% for pediatric anxiety disorders and 5% for ADHD [25].

Also, Boles and his colleagues, 2008 found that scheduling and rewarding toilet sits were

effective in reducing the number of encopretic episodes and increasing the use of the bathroom for a child with secondary nocturnal enuresis who exhibited severe behavior disorders. These findings provide preliminary support for the use of procedures that have been shown to be effective in treating other forms of encopresis and that have been recommended for the treatment of NE [32]. In a systematic review by Brazzelli and his colleagues, 2011 who analyzed 18 trials conducted in children with functional retentive (constipation associated FI), the combined treatment of behavioral interventions and laxatives improve FI more than laxatives alone [33].

We reported that at the end of treatment the scores of revised behavior checklist were decreased that indicate improvement regarding behavior outcomes in relation to the educational level of the fathers of patients of group (A). The best results were found in the high education (university).

We reported that there was negative correlation between the total behavior score and educational levels of the father of the patients of group (A) with statistically significant difference i.e. the higher the educational levels, the lower the total behavior scores (the best results). There was negative correlation between the total behavior score and educational levels of the mothers of the patients of group (A) with statistically significant difference the higher the educational levels, the lower the total behavior scores (the best results). These findings may be attributed to the higher educational level of the parents; they are more cooperative and more supportive for their children in receiving medical treatment and behavioral therapy.

At the end of treatment we found that the scores of revised behavior checklist were decreased that indicate improvement regarding behavior outcomes in relation to the social classes of patients of group (A). The best results were found in high social classes. These results were in line with Von Gontard and his colleagues, 2011 who clarified that the child's type of residence and toilet influence these behaviors. Adverse experiences may be linked to poor living conditions. A pit latrine may be too scary for a little child to use without the fear of falling into. Cleanliness of the toilets may play a part in fastidious personalities who would avoid the filthy toilets at any cost.

Our study had limitations: Behavior training programme need at least six month duration, this made many patient didn't complete the traing programe. The small sample size limit the accuracy of result. Such this study should be all over the country to give accurate result, as localized application of the programe limits the accuracy of results [34].

## 5. CONCLUSIONS

Encoporesis is associated with many behavior problem, depressive symptom and has low quality of life. Encoporesis is associated mainly with ADHD, enuresis and anxiety disorder. Quality of life in children with encoporesis is improved after administration of treatment specially in group A (receiving medical and behavior treatment).

Behavior training program is effective as add on therapy to medical treatment for children with encopresis. Nuclear family type has better outcome after administration of treatment. Social class has important role in effectiveness of the program. Education of father and mother has the essential role in improvement of behavioral symptom and regular attending to program session.

## CONSENT

As per international standards, parental written consent has been collected and preserved by the authors.

## ETHICAL APPROVAL

It is not applicable.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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