

The Relationship of Child Abuse and Functional Constipation in Children: A Case-Control Study

Sima Zahedi¹, Saeed Alinejad², Yazdan Ghandi², Parsa Yousefichaijan³, Bahman Salehi⁴,
Mohammad Rafiei⁵, Amir Almasi-Hashiani⁶, *Seyed Mojtaba Hashemi⁷

¹Student Research Committee, Arak University of Medical Sciences, Arak, Iran.

²Department of Pediatric Cardiology, Arak University of Medical Sciences, Arak, Iran.

³Department of Pediatric Nephrology, Arak University of Medical Sciences, Arak, Iran.

⁴Department of Psychiatry, Arak University of Medical Sciences, Arak, Iran.

⁵Department of Biostatistics, Arak University of Medical Sciences, Arak, Iran.

⁶Department of Epidemiology, Arak University of Medical Sciences, Arak, Iran.

⁷Department of Pediatric Gastroenterology, Arak University of Medical Sciences, Arak, Iran.

Abstract

Background: Child abuse is a serious global problem and can be in the form of physical, sexual, emotional or neglect by not providing for the child's needs. Functional constipation (FC) is a common functional gastrointestinal (GI) disorder in children. This study was aimed to assess the relationship between child abuse and functional constipation in children.

Materials and Methods

In this age frequency-matched case-control study, 100 children with FC were compared with 100 healthy children as control. The diagnosis of FC was based on history and physical examination. Child abuse in three sub-groups (physical, emotional and neglect) were assessed by ISPCAN Child Abuse Screening Tool Children's Version (ICAST-C). The data were analyzed by Stata software (version 13.0).

Results: The results of this study revealed that the frequency of any kind of child abuse in case (children with functional constipation), and control group (children without functional constipation) is 93% and 84%, respectively, OR: 2.53 (95% CI: 1.00-6.45), P=0.052. The most frequent abuse in both groups was emotional abuse (91% vs. 81%) followed by physical (61% vs. 47%), and neglect (19% vs. 8%). There was a significant association between frequency of emotional (OR: 2.37, P=0.046), physical (OR: 1.76, P=0.048) and neglect abuse (OR: 2.70, P=0.027) among case and control groups. However, after controlling the confounding variables, the association between child abuse and FC remained clinically important but was not statistically significant (P>0.05).

Conclusion

Notwithstanding emotional abuse, physical abuse and child neglect rate were more frequent among children with FC, this study demonstrates that child abuse is not associated with FC occurrence.

Key Words: Child Abuse, Children, Constipation, Functional Constipation.

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*Corresponding Author:

Seyed Mojtaba Hashemi (M.D), Address: School of Medicine, Arak University of Medical Sciences, Basij Square, Arak, IR Iran.

Email: Mojtaba53hashemi@yahoo.com

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1- INTRODUCTION

Functional constipation (FC) is a common complaint in childhood. In general, the reported prevalence of FC is reported from 0.7 to 29.6% (1). Most children present with infrequent, painful defecation and involuntary loss of feces. In 90% of constipated children, no organic cause was found and so was named as FC (2-8). Constipation is a common frustrating and lasting disorder in children worldwide which significantly affects the quality of life, so its effect on both physical and emotional well-being of children and their families is unavoidable (9). Child abuse is a serious global problem which estimated about 702,000 children under the age of 18 were abused or neglected in 2014 (10). Although the fatal cases of abuse are less common, children under 3 years old with a prevalence of 71% are more at risk of death (11). Child abuse may lead to three types of damage: child sexual abuse (CSA), child physical abuse (CPA), and child psychological abuse (CPsyA) (12).

Children who experience abuse are more likely to have physical and mental health problems in adulthood (13, 14). These experiences and their undesirable effects will affect the child's life short-term or long-term such as aggressive behaviors, general psychological depression, nervousness and phobia (15-17). Psychological and emotional components have an important role in occurrence of FC and, on the other hand, results of some studies showed that FC plays a role in emotional problems. Abdominal pain and psychological stress predisposes children to development of FC (18-20). Drossman et al. in their study underlined the importance of abuse history which leads to gastrointestinal illness and psychological disturbance (21). But there is no investigation which assessed whether child abuse in children may lead to FC. This present study was carried out to determine

the relationship between child abuse and FC.

2- MATERIALS AND METHODS

2-1. Study Design

This single hospital-based age frequency-matched case control study was conducted in Department of Pediatrics of Amir-Kabir Hospital in Arak/Iran. All eligible cases and control were included in the study through convenient sampling.

2-2. Setting

All clinic-referred children who met inclusion criteria were included in the study. Of these, two groups of 100 cases were selected, one hundred patients with FC and one hundred healthy children.

2-3. Participants

All children with FC diagnosed according to Nelson and Sadock (22, 23) criteria were assigned to the case group, and all children who referred to Pediatric clinic for non-chronic disease were considered as the control group, age range: 5-17 years old, without any history of physical and mental illness or mental retardation in child or his/her family, anti-constipations were the only drugs used by patients. Informed consent or parental written informed consent for children under 12 years was obtained. Parents who withdrew their children from the study were considered as exclusion criteria. Interviews were completed by 100 patients as case group who met inclusion criteria and 100 healthy children were assigned as control group. The children in control group were chosen from patients without constipation who referred to the Pediatric clinic of Amir-Kabir Hospital. All participants were assessed by ISPCAN Child Abuse Screening Tool Children's Version (ICAST-C) in terms of child abuse (24).

2-4. Variables and Data Measurement

The ICAST-C (child version) is a multi-national, multi-lingual, consensus-based survey instrument. The ICAST-C is a Child Abuse Screening Tool-Children's Institutional Version at the International Society for the Prevention of Child Abuse and Neglect (ISPCAN). This multi-national, multi-lingual and consensus-based screening tool is a survey instrument developed by ISPCAN in association with WHO and UNICEF. ICAST-C is translated and is available in six languages for international research to estimate child victimization (25). It assesses all forms of abusive experiences and is used for children aged 12–17 years (25).

Persian version of ICAST-C was administered, evaluated and confirmed in primary school children. Due to the sensitivity of child abuse in the sexual sphere and lack of consistency with the concepts used in Iranian culture, this part has been removed from this questionnaire. A total of 26 questions were confirmed that in the emotional and physical areas each of the ten questions and areas of neglect were confirmed by 6 questions. In these three areas, questions were shown on a 3-point Likert scale of frequency.

This is used to generate a score (range: 10–30), with higher scores reflecting greater severity of symptoms for physical, emotional areas and ranged from 6-18 for neglect area. To assess reliability, Cronbach's alpha was calculated. Cronbach's alpha value in physical, emotional and neglect areas were respectively 98%, 96% and 83%, respectively (26). Child physical abuse refers to maltreatment and abusive acts toward child. In both groups sex, age, father's and mother's job, father's and mother's education, habitat, parental income, body mass index (BMI), failure to thrive (FTT), gestational age, history of diseases, breast feeding, toilet use and consuming purified water were assessed.

2-5. Study size

Considering type I error 0.05 and study power 0.80 (beta or type two error: 0.20), to find a difference of 40% (based on expert opinion), the required sample size was calculated as 97 children in each group.

2-6. Ethical Consideration

This study was approved by the Ethics Committee of Arak University of Medical Sciences and the principles of medical ethics were respected at all stages of the study (Code of Ethics: IR.ARAKMU.REC.1394.294).

2-7. Statistical Methods

Statistical analyses were done by running Stata 13.0 (Stata Corp LLC, College Station, Texas, USA). Categorical variables were presented as number (percentage) and continuous variables were presented as mean (standard deviation). The association of categorical variables was assessed by likelihood ratio Chi-square test and binary logistic regression. Two-independent sample t-test was used to compare the means of continuous variables among groups. Penalized logistic regression was used to adjust the effect of potential confounders. P-value less than 0.05 was considered as significance level.

3- RESULTS

In this study a total of two hundred children (100 in each case and group) participated in which 56% of cases and 47% of controls were male ($p=0.203$). The baseline characteristics data of the two groups are presented in **Table.1**. There was a significant difference between the groups regarding constipation history ($p=0.001$), migraine history in family ($p=0.001$), being in rural area ($p=0.027$), and lower family income ($p=0.024$) which were higher among cases and the mean of child's age ($p=0.029$) which was higher

among controls. The other variables had the same distribution in the two groups (**Table.2**). The study population indicated if there was any child abuse by ICAST- C. Then we measured child abuse in three sub-groups (physical, emotional and neglect). As displayed in **Figure.1**, the frequency of child abuse and its dimensions was most frequent in cases than controls. The results showed that the reported child abuse in the case group was higher (93% vs. 84%, unadjusted odds ratio [OR]: 2.53, 95% confidence interval [CI]: 1.00-6.45, p=0.052), which indicates that there was at least one kind of child abuse in 93% of cases and 84% of controls, and also the finding showed a significantly higher prevalence of emotional abuse (91% vs. 81%, unadjusted OR: 2.37, 95% CI: 1.01-5.53, p=0.046), physical abuse (61% vs. 47%, unadjusted OR: 1.76, 95% CI: 1.01-3.09, p=0.048) and neglect abuse (19% vs. 8%, unadjusted OR: 2.70, 95% CI: 1.12-6.50, p=0.027)

among cases compared to controls. Because of some potential confounders, we performed a traditional binary logistic regression to adjust the confounding effects. Due to some sparsity (low sample size) in categories of interested exposures and outcome which leads to the estimation of a wide 95% CI in traditional binary logistic regression, penalized binary logistic regression was used to adjust the concerned confounding effects. The adjusted results of penalized binary logistic regression indicated that there was not a statistically significant relationship between child abuse and its dimensions and occurrence of FC, but the observed odds ratios were clinically important. The adjusted OR for any kind of child abuse, emotional abuse, physical abuse and neglect abuse was 2.10 (95% CI: 0.83-5.32), 2.12 (95% CI: 0.92-4.94), 1.47 (95% CI: 0.82-2.62), and 2.17 (95% CI: 0.90-5.25), respectively.

Table-1: Comparison of demographic and medical variables in children with and without functional constipation.

Parameter	Children with functional constipation	Children without functional constipation	P- value	
Male gender, number	56 (56 %)	47 (47 %)	0.203	
Child's age (year) ± SD	7.47±2.11	8.15 ± 2.23	0.029	
Father's Education (year)	11.32±3.36	11.80±3.41	0.318	
Mother's Education (year)	11.30±3.43	11.94±3.11	0.169	
Migraine history in the family	44 (44 %)	20 (20 %)	0.001	
Surgical history	13 (13%)	6 (6%)	0.121	
History of constipation	98 (98%)	3 (3%)	0.001	
Single child	7 (7%)	3 (3%)	0.188	
Failure to thrive (FTT)	1 (1%)	1 (1%)	1.00	
Optimum growth	99 (99%)	97 (97%)	0.302	
Gestational age (Not normal)	3 (3%)	6 (6%)	0.397	
Birth weight (Not normal)	14 (14%)	11 (11%)	0.218	
BMI (Not normal)	40 (40%)	33 (33%)	0.739	
Breast feeding	87 (87%)	89 (89%)	0.663	
Toilet use	56 (56%)	59 (59%)	0.668	
Secondhand smoking	28 (28%)	18 (18%)	0.092	
Access to refined drinking-water	100 (100%)	100 (100%)	1.00	
Parental Income (dollar)	Less than 260	42 (42%)	26 (26%)	0.024
	260 to 520	37 (37%)	55 (55%)	
	More than 520	21 (21%)	19 (19%)	
Habitat	Village	17 (17%)	7 (7%)	0.027

	City	83 (83%)	93 (93%)	
Father's job	None	7 (7%)	6 (6%)	0.471
	Part-time	27 (27%)	35 (35%)	
	Full-time	66 (66%)	59 (59%)	
Mother's job	Housewife	87 (87%)	92 (92%)	0.184
	Full-time	4 (4%)	5 (5%)	
	Part-time	9 (9%)	3 (3%)	

SD: Standard deviation.

Table-2: Binary logistic regression to determine the child abuse association with constipation of children

Child abuse	Total	Case group	Control group	OR (95% CI), p-value [†]	AOR* (95% CI), p-value [‡]
Emotional	86%	91%	81%	2.37 (1.01-5.53), 0.046	2.12 (0.92-4.94), 0.080
Physical	54%	61%	47%	1.76 (1.01-3.09), 0.048	1.47 (0.82-2.62), 0.191
Neglect	13.5%	19%	8%	2.70 (1.12-6.50), 0.027	2.17 (0.90-5.25), 0.084
Child abuse (Total)	88.5%	93%	84%	2.53 (1.00-6.45), 0.052	2.10 (0.83-5.32), 0.114

OR: Odds Ratio, AOR: Adjusted odds ratio, CI: Confidence Interval.

*Adjusted for: Age, secondhand smoking and habitat.

[†] Traditional binary logistic regression.

[‡] Penalized binary logistic regression.

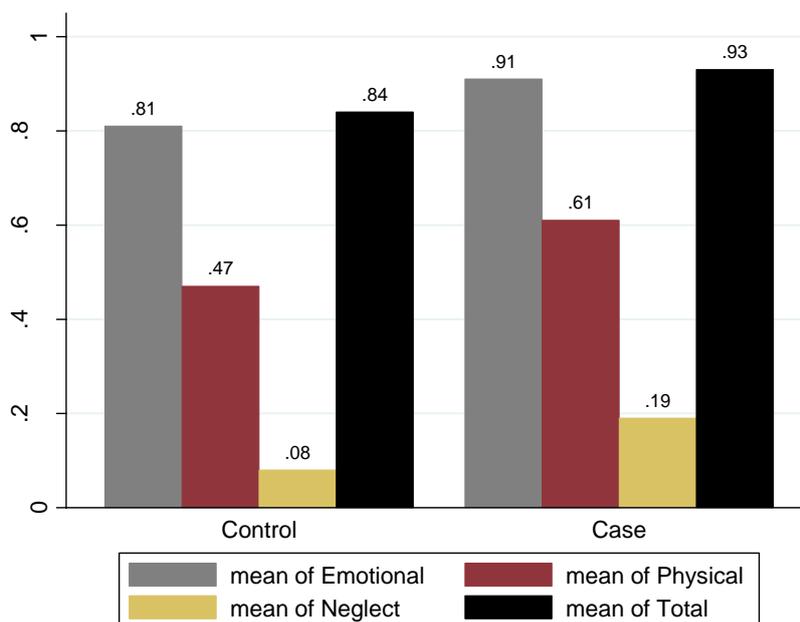


Fig.1: The comparison of child abuse frequency in children with and without functional constipation.

4- DISCUSSION

The goal of this study was to assess the relationship of child abuse and functional constipation in a case-control study. The findings of this study revealed that the

frequency of child abuse was statistically higher in children with FC (case group). Also, emotional abuse, physical abuse and neglect rate in this study were statistically higher in children with constipation than

children without constipation. It is the main result on which our research is based, so child abuse may be considered as a risk factor for FC in children. FC with 3% prevalence in children is one of the common problems in childhood which in most cases there is no obvious reason such as anatomical, biochemical or physiological abnormalities for it (1, 27). Children with constipation are often faced with defecations such as fecal incontinence and abdominal pain. This disorder would have a significant impact on distress and health care cost in family (28).

More recent evidence showed that many factors contribute in incidence of constipation in children (29). The pathophysiology of functional constipation in children is unknown and multi-factorial. Although withholding behavior is one of the most common mechanisms for functional constipation, some medically unexplained symptoms which are observed in children with unclear pathology are challenging and treatment can often be difficult (30). A systematic review performed in the United States investigated the epidemiology of constipation in children and adults and revealed that constipation is more frequent in female gender (2).

Our results revealed that, there is no significant relationship between gender and FC. McCrea et al. (31) in their study suggested that women experienced constipation symptoms more frequently than men. Only a small part of the literature has assessed the medical impact of physical or emotional abuse in childhood; however, most of the studies had not investigated the other childhood complications and disorders due to child sexual abuse (15). Romans in her study emphasized that there is not any published study which looked directly at the link between abuse and bladder problems (32). In the United States, about 3 million cases of child abuse are reported as alleged

victims of maltreatment in each year (33) which affects approximately 16% of men and 25-27% of women (35). In other countries around the world, there is a broad range of the mentioned prevalence (maltreatment in childhood) (34, 35), which is associated with poor outcomes including increased prevalence of psychiatric disorders, engagement in high-risk behaviors (36-39), and decreased health-related quality of life and is also associated with 47% of all childhood-onset psychiatric disorders and 26- 32% of adult-onset disorders (40-42). In the present study, the results showed a high prevalence rate of child abuse in both case and group. In this study, after controlling the confounding variables, child abuse did not show a significant relationship with constipation.

In 2012, one investigation assessed the constipation in 1365 Sri Lankan children and could find an association with physical, sexual, emotional abuse by using Rome III criteria for pediatric functional gastrointestinal diseases (43). In our study, before the control of confounding variables, this relationship was observed but in the adjusted results, the relationship between child abuse and constipation was not significant. Rajindrajith et al. (6), in their study claimed that in few studies performed in this regard, the effect had been assessed indirectly and insufficiently because of failure to investigate the impact of common family and school related stressful events.

Therefore, in this study, we tried to investigate this relationship after controlling the confounding variables. The same as our study findings, previous studies demonstrated that the frequency of any kind of abuse was strongly associated with the odds of having psychiatric disorders (44). Peeters et al. in their study stressed that autism spectrum disorders (ASD) were frequently found in children with functional defecation disorders (45).

In the other direction, different forms of abuse which may appear less severe can have irreversible effects and may have consequences on adult mental health if they happen several times, as it may induce enduring dysfunction in brain circuits activated by stress (46). Researches on the role of psychological factors on the pathogenesis of FC have shown that in the FC patients, high levels of emotional distress were reported (47-49). Higher prevalence of anxiety, depression, and social dysfunction in patients with FC has been reported (50, 51). Since the definite cause of constipation in children with FC is unclear. Recent researches introduced psychological abnormalities as contributory factors. Also, physical or psychological trauma was reported significant in children with constipation (52-54). Our results indicate child abuse was significantly higher in patients with FC, thus, it seems that the results confirm the previous studies.

4-1. Limitations of the study

It should be noted that due to cultural barriers, the most important limitation is inability to investigate sexual abuse in this Iranian sample. Also, failure to observe a significant relationship between child abuse and FC is due to the limited sample size in this study. Therefore, a similar study with a larger sample size is recommended.

5- CONCLUSION

Notwithstanding emotional abuse, physical abuse and child neglect rate were more frequent among children with FC, this study demonstrates that child abuse is not associated with occurrence of FC. It should be highlighted that although there is no statistically significant difference between the two groups, the observed difference in the percentage of child abuse

between the two groups is clinically important and requires more studies.

6- ABBREVIATIONS

FC: Functional Constipation
GI: Gastrointestinal
ASD: Autism Spectrum Disorders
OR: Odds Ratio
CI: Confidence Interval
ICAST-C: Child Abuse Screening Tool-Children's Institutional Version
ISPCAN: International Society for the Prevention of Child Abuse and Neglect
BMI: Body Mass Index
FTT: Failure to Thrive.

6- CONFLICT OF INTEREST: None.

7- ACKNOWLEDGMENTS

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