

Pica in Children and Adolescents: Environmental Factors and Psychosocial Impact

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Abstract

Original Research Article

Background: Pica, defined as the persistent ingestion of non-nutritive and non-edible substances, represents a major clinical challenge in child and adolescent psychiatry. While its organic and behavioral dimensions are well documented, the role of environmental and psycho-affective factors in its emergence and maintenance remains insufficiently explored, particularly in the Moroccan context. **Methods:** We conducted a cross-sectional analytical and descriptive study of 16 patients aged 2 to 18 years, followed on an outpatient basis and/or in the day hospital of the child and adolescent psychiatry department of Ar-razi Hospital in Sale, over a three-month period. The diagnosis of Pica was established according to DSM-5-TR criteria. Fisher's exact tests were used to explore associations between categorical variables, and Spearman correlation for continuous variables. **Results:** Our sample consisted of 16 patients. The mean age was 8.34 years, with an equal sex distribution. The most frequently ingested substances were paper (62%), soil (56%), and plastic (25%). Autism Spectrum Disorder was the main comorbidity (25%), followed by ADHD (20%). A disturbed family dynamic was found in 37% of cases, with a predominance of insecure attachment (75%). A trend toward association between active parental psychopathology and disturbed family dynamics was observed (OR = 9.00; $p = 0.118$), as well as between disturbed dynamics and affective deprivation (OR = 9.00; $p = 0.118$). A negative trend correlation between age and ingestion frequency was noted ($\rho = -0.49$; $p = 0.055$). Parental repercussions were significant, with 94% reporting major anxiety and 92% constant hypervigilance. Psychoeducation and environmental securing were the primary therapeutic approaches (94%). **Conclusion:** Pica in child psychiatry reflects an etiological complexity combining neurodevelopmental disorders, nutritional deficiencies, and environmental vulnerabilities. Despite the limited sample size, clinically relevant trends suggest a central role of family dynamics and parental psychopathology. An integrative management approach combining parental support and environmental security appears essential for lasting remission.

Keywords: Pica; environmental factors; child psychiatry; insecure attachment; psychosocial impact.

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INTRODUCTION

Pica is an eating disorder defined by the persistent ingestion, for at least one month, of non-nutritive and non-edible substances, in a manner that is neither culturally sanctioned nor developmentally appropriate [1]. Recognized in the DSM-5-TR as a distinct disorder, it predominantly affects young children, individuals with intellectual disabilities or autism spectrum disorder, and pregnant women. Its prevalence remains difficult to estimate due to frequent underdiagnosis, with rates reaching 23% among children with ASD according to some studies [2].

While the organic dimensions of Pica — particularly iron and zinc deficiencies — are well documented in the literature [3], its environmental and psycho-affective determinants remain insufficiently explored. Several studies suggest that the quality of early attachment, affective deprivation, family dysfunction, and psychosocial stress play a determining role in the emergence and maintenance of this disorder [4,5]. These factors likely interfere with the development of the child's self-regulation capacities, leading them to seek substitute oral stimulation [4].

In the African and Maghrebi context, data on Pica remain scarce. The few available studies highlight

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its frequent association with socioeconomic precarity and nutritional deficiencies [3]. In Morocco specifically, no published study to date has systematically explored the environmental factors associated with Pica or its repercussions on family dynamics. The objectives of this study are to identify environmental and psycho-affective factors associated with Pica in our clinical setting, to assess the impact on family dynamics, and to describe the parental experience.

METHODS

1. Participants and Procedure

We conducted a cross-sectional analytical and descriptive study of 16 patients followed at the child and adolescent psychiatry department of Ar-razi University Psychiatric Hospital in Sale, Morocco, over a three-month period. The study was conducted in accordance with the principles of the Declaration of Helsinki. Informed consent was obtained from parents or legal guardians of all included patients. Data were anonymized and handled confidentially. Inclusion criteria were: age between 2 and 18 years, diagnosis of Pica established according to DSM-5-TR criteria [1], and active follow-up in the department. Clinical data were collected through semi-structured interviews with parental figures and review of medical records.

2. Measures

Sociodemographic and clinical variables. Data collected included sex, age, schooling status, sibling composition, socioeconomic conditions, and psychiatric comorbidities diagnosed according to DSM-5-TR criteria.

Environmental and psycho-affective factors. Environmental factors explored included family dynamics, considered disturbed in the presence of recurrent marital conflicts, parental separation, intrafamilial violence, or active parental psychopathology. The quality of parent-child attachment was assessed through semi-structured clinical interviews with parental figures and direct observation of interactions during consultations, according to Ainsworth's classification distinguishing secure, anxious insecure, and disorganized insecure attachment [6]. Affective deprivation was defined as a reported lack of affective interactions and emotional availability of parental figures. Other factors explored included lack of

stimulation, family psychiatric history, presence of active parental psychopathology, early separations from parental figures, and notion of neglect.

Ingested substances and Pica characteristics. The nature of ingested substances, frequency of ingestions (daily or weekly), and duration of the disorder were systematically collected.

Parental repercussions. Parental experience was explored through several dimensions: presence of major anxiety related to the disorder, constant hypervigilance, fear of others' judgment, fear of harmful ingestion, and sense of parental failure.

Management. Therapeutic approaches implemented were recorded, including psychoeducation, environmental securing, treatment of nutritional deficiencies, cognitive-behavioral therapy, work on triggering and perpetuating factors, and treatment of comorbidities.

3. Statistical Analyses

Statistical analyses were performed using Python software (SciPy library). The threshold for statistical significance was set at $p < 0.05$ for all tests. Descriptive analyses (frequencies, percentages, means, and standard deviations) were conducted to characterize the sociodemographic and clinical features of the sample. Fisher's exact tests were used to explore associations between categorical variables, given the small sample size. A Spearman correlation was calculated to examine the relationship between age and ingestion frequency. Results approaching the significance threshold were reported as clinically relevant trends.

RESULTS

1. Descriptive Statistics

Our sample consisted of 16 patients aged 2 to 18 years, with a mean age of 8.34 years ($SD = 3.8$). Sex distribution was balanced (50% girls, 50% boys). Among participants, 75% were enrolled in school. Socioeconomic conditions were rated as average in 62% of cases. Ingestion frequency was daily in 69% of patients. The most frequently ingested substances were paper (62%), soil (56%), and plastic (25%). ASD was the main comorbidity (25%), followed by ADHD (20%) (Table 1).

Table 1: Sociodemographic and clinical characteristics of the sample (n=16)

Variable	n (%)
Sociodemographic data	
Female sex	8 (50%)
Mean age (SD)	8.34 years (3.8)
Enrolled in school	12 (75%)
Average social conditions	10 (62%)
Unfavorable social conditions	3 (19%)
Pica characteristics	
Daily ingestions	11 (69%)
Duration ≥ 1 year	14 (87%)

Paper	10 (62%)
Soil	9 (56%)
Plastic	4 (25%)
Psychiatric comorbidities	
Autism Spectrum Disorder (ASD)	4 (25%)
ADHD	3 (20%)
Intellectual Developmental Disorder / Global developmental delay	2 (13%)
Dissociative Attachment Spectrum Disorder	1 (6%)
Adjustment disorder	1 (6%)
Enuresis	1 (6%)
Schizophrenia	1 (6%)
Conduct disorder	1 (6%)
Social anxiety	1 (6%)
Epilepsy (Lennox-Gastaut)	1 (6%)
Environmental factors	
Disturbed family dynamics	6 (37%)
Insecure attachment (total)	12 (75%)
of which: anxious insecure	4 (25%)
of which: disorganized insecure	8 (50%)
Affective deprivation	4 (25%)
Lack of stimulation	6 (37%)
Family psychiatric history	5 (31%)
Iron deficiency anemia	8 (50%)
Parental repercussions	
Major anxiety related to the disorder	15 (94%)
Constant hypervigilance	15 (92%)
Sense of parental failure	8 (50%)

SD: standard deviation; ASD: Autism Spectrum Disorder; ADHD: Attention Deficit Hyperactivity Disorder.

2. Environmental Factors and Quality of Attachment

A disturbed family dynamic was found in 37% of cases (n = 6), despite 83% of parents being married. A predominance of insecure attachment was observed, with 50% disorganized insecure attachment, 25% anxious insecure attachment, and only 25% secure attachment

(Figure 1). Signs of affective deprivation were found in 25% of cases (n = 4) and lack of stimulation in 37% (n = 6). Furthermore, 31% of patients presented language delay and 25% had a history of orality disorders. Neglect was noted in 19% of cases.

Figure 1: Distribution of parent-child attachment quality (n=16), according to Ainsworth's classification [6].

Attachment type	n	%
Secure attachment	4	25%
Anxious insecure attachment	4	25%
Disorganized insecure attachment	8	50%
Total insecure attachment	12	75%

Note: A pie chart illustrating this distribution can be inserted from the original poster.

3. Statistical Tests

Fisher's exact tests revealed clinically relevant trends, although none reached the conventional significance threshold ($p < 0.05$), reflecting the limited statistical power inherent to the sample size (Table 2). A trend toward association between active parental

psychopathology and disturbed family dynamics was observed (OR = 9.00; $p = 0.118$), as well as between disturbed dynamics and affective deprivation (OR = 9.00; $p = 0.118$). A negative correlation trend between age and ingestion frequency was noted ($\rho = -0.49$; $p = 0.055$).

Table 2: Statistical test results

Association tested	Test	OR / rho	p-value	Interpretation
Active parental psychopathology → Disturbed family dynamics	Fisher exact	OR = 9.00	0.118	Trend
Disturbed family dynamics → Affective deprivation	Fisher exact	OR = 9.00	0.118	Trend
Age ↔ Ingestion frequency	Spearman	$\rho = -0.49$	0.055	Trend

OR: Odds Ratio. rho: Spearman correlation coefficient. Significance threshold: $p < 0.05$.

4. Parental Repercussions and Management

Parental repercussions were substantial, with 94% reporting major anxiety related to the disorder and 92% experiencing constant hypervigilance. Fear of harmful ingestion and fear of others' judgment were systematic. Parental sense of failure was present in 50% of cases. Regarding management, psychoeducation and environmental securing constituted the first-line therapeutic approaches (94%). Cognitive-behavioral therapy was initiated in 63% of cases. At the end of follow-up, 87% of parents expressed satisfaction with the quality of care.

DISCUSSION

This study contributes to a better understanding of Pica in child psychiatry, highlighting the etiological complexity of this disorder and the importance of environmental and psycho-affective factors in its emergence and maintenance. Our results reveal that Pica develops within a frequently fragile familial and developmental context, characterized by a predominance of insecure attachment, stimulation deficits, and active parental psychopathologies.

Clinical profile and comorbidities

Our sample presents a mean age of 8.34 years with balanced sex distribution, deviating from some institutional studies where male predominance is often described with ratios ranging from 1.3 to 2 [3]. The close association with ASD (25%) confirms the preponderant role of neurodevelopmental disorders as a major risk factor for Pica [2,4]. This correlation may be explained by the sensory regulation dysfunctions inherent to ASD, driving the child to seek non-social oral stimulation [4]. Iron deficiency anemia (50%) further supports the mineral-seeking hypothesis [3].

Environmental factors and the role of attachment

The originality of our work lies in identifying a disturbed environmental substrate. Although 83% of parents are married, a disturbed family dynamic was noted in 37% of cases, with a marked predominance of insecure attachment (75%), including 50% disorganized forms. This stimulation (37%) and affective (25%) deficits act as factors for the emergence and maintenance of the disorder. The literature confirms that impoverished environments and lack of meaningful social interactions promote auto-stimulation through object ingestion [3,5]. Our statistical results, although not significant due to the limited sample size, reveal clinically important trends: an association between active parental psychopathology and disturbed family dynamics ($OR = 9.00$; $p = 0.118$), as well as between disturbed dynamics and affective deprivation ($OR = 9.00$; $p = 0.118$). The negative correlation observed between age and ingestion frequency ($\rho = -0.49$; $p = 0.055$) is consistent with literature reporting spontaneous resolution of Pica with advancing age [3].

Psychosocial repercussions and parental experience

Parental repercussions were massive, with 94% of parents presenting major anxiety and 92% experiencing constant hypervigilance. This experience is often exacerbated by fear of others' judgment and sense of failure (50%), potentially leading to stigmatization and social isolation of the family [3]. These data underscore the importance of a management approach that systematically integrates parental support. Moline *et al.*, demonstrated that family involvement in management significantly improves therapeutic outcomes [4].

Therapeutic strategies

In accordance with international recommendations favoring the least restrictive approaches as first-line treatment, psychoeducation and environmental securing constituted our primary therapeutic approaches (94% of cases) [5]. The effectiveness of Cognitive-Behavioral Therapy, implemented in 63% of our cases, is widely supported by the literature, particularly through the use of contingent reinforcement to reduce ingestion rates [4,5]. The high parental satisfaction rate (87%) attests to the adequacy of our therapeutic approach.

Limitations and future directions

This study has several limitations. First, its cross-sectional design does not allow causal relationships to be established. Second, the limited sample size ($n = 16$) restricts statistical power and generalizability of results. Third, the assessment of attachment quality relied on clinical appraisal without a validated standardized tool, which limits inter-rater reliability. Fourth, monocentric recruitment in a specialized university department may introduce selection bias. Despite these limitations, this study represents an original contribution in the Moroccan context. Longitudinal multicentric studies integrating standardized assessment tools and objective measures of nutritional deficiencies will be needed to confirm and deepen these findings.

CONCLUSION

This study highlights the etiological and psychosocial complexity of Pica in child psychiatry, underscoring the determining role of environmental factors and family dynamics in the emergence and maintenance of this disorder. Our results confirm the close association between Pica and neurodevelopmental disorders, particularly ASD, while revealing a disturbed environmental substrate characterized by a predominance of insecure attachment, affective deprivation, and active parental psychopathologies.

The massive impact of the disorder on parental figures, with major anxiety and near-universal hypervigilance, calls for an integrative management approach that goes beyond symptomatic treatment alone.

Beyond organic and behavioral correction, parental support and environmental security appear as indispensable pillars for lasting remission.

This study, one of the first conducted in Morocco on this topic, underscores the need to develop longitudinal multicentric research integrating standardized tools, in order to better characterize the environmental mechanisms involved and to optimize prevention and intervention strategies targeting this vulnerable population.

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