

Exploring The Relationship Between Psychological Stress and Development of Pica in Children

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Introduction

Pica is a behavioural disorder characterized by the persistent ingestion of non-nutritive and non-food substances for at least one month at an age when such behaviour is developmentally inappropriate.¹ According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), the behaviour should not be culturally or socially accepted and must be severe enough to require clinical attention.¹ Commonly ingested substances include soil, chalk, paper, paint, soap, cloth, hair, ice, and plastic. While mouthing behaviour is considered normal in children younger than two years,

persistent ingestion beyond this age is regarded as pathological.

Pica is recognized as a multifactorial condition influenced by nutritional, psychological, environmental and socioeconomic factors.² Nutritional deficiencies particularly iron and zinc deficiency, have traditionally been associated with its development.³ However, increasing evidence suggests that psychosocial stressors and emotional disturbances also play a significant role, especially among children.⁴ Children exposed to chronic stress, inadequate parental care, family conflict, school-related anxiety, bullying or social isolation may develop

maladaptive coping behaviour such as ingestion of non-food substances.⁴

Apart from its psychological implications, Pica can lead to serious medical and dental complications. Medical consequences include intestinal obstruction, parasitic infections, lead toxicity, nutritional deficiencies and gastrointestinal perforation.⁵ Oral manifestations may include dental abrasion, tooth wear, enamel fractures, gingival injury, halitosis and periodontal problems.⁶ Previous studies have also reported a higher prevalence of Pica among children with emotional disturbances, neglect, intellectual disability, autism spectrum disorders and adverse childhood experiences.⁴

Despite growing awareness of childhood behavioural disorders, literature evaluating the relationship between psychological stress and Pica remains limited, particularly in the Indian paediatric population.⁷ Most studies have focused primarily on nutritional deficiencies rather than psychosocial contributors. Therefore, the present study was undertaken to evaluate the association between psychological stress and Pica behaviour amongst children aged 5–10 years using the Perceived Stress Scale for Children (PSS-C) and to identify common psychosocial stressors associated with the condition.

Materials and Methods

Study Design

The present study was designed as a cross-sectional observational study conducted in the Department of Paediatric and Preventive Dentistry to evaluate the association between psychological stress and Pica behaviour in children aged 5–10 years. Objectives were to (i) assess the stress levels among children exhibiting Pica behaviour using the Perceived Stress Scale for Children (PSS-C) (ii) compare psychological stress levels between children with and without Pica behaviour (iii)

To identify common psychosocial stressors associated with Pica behaviour in children.

Ethical Considerations

The study protocol was reviewed and approved by the Institutional Ethical Committee prior to commencement of the study. Written informed consent was obtained from the parents or legal guardians before inclusion of children in the study.

Study Population

A total of 80 children aged between 5–10 years visiting the Department of Paediatric and Preventive Dentistry were included in the study.

The participants were divided into two groups:

- **Group A:** Children exhibiting Pica behaviour (n = 40)
- **Group B:** Children without Pica behaviour (n = 40)

Diagnostic Criteria for Pica

Diagnosis of Pica was established according to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) criteria,¹ which included:

- Persistent eating of non-food and non-nutritive substances for at least one month.
- Eating behaviour inappropriate to the developmental level of the child.
- Behaviour not culturally or socially accepted.

Inclusion and Exclusion Criteria

Children aged 5–10 years who exhibited Pica behaviour, who were able to communicate their experiences and respond to assessments and whose parents or guardians provided prior informed consent were included in the study. Children with physical or mental disabilities, major neurological disorders, systemic diseases, or iron deficiency anaemia were excluded from the study.

Assessment of Psychological Stress

Psychological stress was assessed using the Perceived Stress Scale for Children (PSS-C), a standardized

questionnaire designed to evaluate stress perception in children.

Based on the obtained scores, subjects were categorized into:

- Low stress: 0–13
- Moderate stress: 14–26
- Severe stress: 27–39

The questionnaire included items assessing emotional stress, school-related stress, parental interaction, peer relationships, sleep disturbances, loneliness, anger and coping difficulties.

Data Collection Procedure

Children fulfilling the inclusion criteria were screened for the presence or absence of Pica behaviour. After obtaining informed consent, the PSS-C questionnaire was administered in a child-friendly manner. Responses were recorded and stress scores were calculated for each participant.

Psychosocial contributing factors including fear, nervousness, school-related anxiety, parental neglect, loneliness, peer conflicts, anger, sleep disturbances and low energy levels were additionally assessed.

Statistical Analysis

The collected data was analysed using SPSS software version 21 for Windows. Descriptive statistics were expressed as frequencies and percentages. Data normality will be checked by using Shapiro – Wilk test. Confidence interval is set at 95% and probability of alpha error (level of significance) set at 5%. Power of the study set at 80%. Comparisons between groups will be done using unpaired t test in relation to quantitative parameters. Comparisons between groups will be done using chi square test in relation to qualitative parameters. A p-value less than 0.05 was considered statistically significant.

Results

A total of 80 children aged 5–10 years participated in the study, comprising 40 children with Pica behaviour (Group A) and 40 children without Pica behaviour (Group B).

The mean age of children in Group A was 7.90 ± 1.37 years, while the mean age in Group B was 7.77 ± 1.16 years. No statistically significant difference was observed between the groups with respect to age ($p = 0.662$). Similarly, gender distribution was comparable between the groups, with no significant difference observed ($p = 0.654$).

Analysis of total stress scores revealed a highly significant association between psychological stress and Pica behaviour ($\chi^2 = 18.514$, $p < 0.001$). Amongst children with Pica, 55% exhibited moderate stress levels and 30% exhibited severe stress levels. In contrast, children without Pica predominantly demonstrated low stress levels i.e. 60% (Table 1).

A statistically significant association was observed between Pica behaviour and stress related to school performance or grades ($\chi^2 = 17.117$, $p = 0.001$). Children with Pica reported higher levels of school-related stress compared to children without Pica.

Parental emotional support also demonstrated a significant association with Pica behaviour. Children with Pica more frequently reported that their parents provided emotional reassurance only occasionally, compared to children without Pica ($\chi^2 = 6.721$, $p = 0.035$).

A highly significant association was observed between Pica behaviour and feelings of fear or nervousness ($\chi^2 = 46.063$, $p < 0.001$). Similarly, peer conflicts were significantly more common among children with Pica than among children without Pica ($\chi^2 = 22.552$, $p < 0.001$).

Further analysis of psychosocial variables demonstrated significant associations between Pica behaviour and feelings of loneliness ($\chi^2 = 30.599$, $p < 0.001$), perception that parents did not listen to them ($\chi^2 = 41.052$, $p < 0.001$), feelings of anger ($\chi^2 = 10.483$, $p = 0.005$), and feeling tired or lacking energy ($\chi^2 = 34.932$, $p < 0.001$).

However, no statistically significant association was observed between Pica behaviour and feelings of sadness

or unhappiness ($p = 0.093$), trouble sleeping ($p = 0.162$), or inability to handle problems ($p = 0.120$).

Overall, children with Pica behaviour demonstrated significantly higher levels of psychological stress and were more likely to report adverse psychosocial experiences compared to children without Pica.

Table 1: Association of Total Stress Score with Pica Behaviour

Stress Level	Pica (n=40)	No Pica (n=40)
Low	6 (15%)	24 (60%)
Moderate	22 (55%)	13 (32.5%)
Severe	12 (30%)	3 (7.5%)

Chi-square test = 18.514, $p < 0.001$ (Highly significant)

Table 2: Psychosocial Stressors Associated with Pica Behaviour

Variable	p-value	Significance
Felt scared or nervous	<0.001	Highly significant
Fights with friends	<0.001	Highly significant
Worried about grades/school	0.001	Significant
Inadequate parental care	0.035	Significant
Feeling lonely	<0.001	Highly significant
Parents did not listen	<0.001	Highly significant
Feeling tired/low energy	<0.001	Highly significant
Feeling angry	0.005	Significant
Feeling sad/unhappy	0.093	Not significant
Trouble sleeping	0.162	Not significant
Unable to handle problems	0.120	Not significant

Discussion

The present study evaluated the association between psychological stress and Pica behaviour among children aged 5–10 years. The findings demonstrated a significant association between elevated stress levels and the presence of Pica behaviour. Children with Pica showed significantly higher levels of moderate and severe stress levels compared to children without Pica, suggesting that

psychological stress may contribute to the occurrence of this condition.

Pica is a multifactorial disorder influenced by nutritional, developmental, environmental, and psychosocial factors.² Although iron deficiency has traditionally been considered an important etiological factor,³ recent evidence suggests that emotional and behavioural factors may also play a significant role. The present findings support this concept and indicate that psychological

stress should be considered during assessment of children exhibiting Pica behaviour.

In the present study, 55% of children with Pica demonstrated moderate stress levels, while 30% demonstrated severe stress levels. In contrast, most children without Pica exhibited low stress levels. These findings suggest that children experiencing higher levels of stress may be more likely to develop maladaptive behaviours such as ingestion of non-food substances.

The results are consistent with those reported by Singhi et al.,⁴ who found significantly higher psychosocial stress among children with Pica and highlighted the role of adverse family environments and maternal deprivation. Similarly, the present study identified inadequate parental care and feeling that parents did not listen as significant factors associated with Pica behaviour. These findings emphasize the importance of parental emotional support in a child's psychological well-being.

Several psychosocial stressors were significantly associated with Pica behaviour, including feeling scared or nervous, peer conflicts, school-related worries, loneliness, anger and low energy levels. Academic pressure, social difficulties, and lack of emotional support may contribute to psychological distress, which in turn may influence behavioural responses in children.⁸ The significant association observed with loneliness further supports the role of emotional factors in the development of Pica behaviour.⁹

The findings of the present study are also supported by Emond et al.,⁷ who reported associations between Pica and emotional as well as behavioural difficulties in children. Collectively, these studies suggest that Pica should not be viewed solely as a nutritional disorder but as a condition with important psychosocial components. From a paediatric dentistry perspective, these findings are clinically relevant because children with Pica may

present with oral manifestations such as dental abrasion, enamel wear, tooth fracture, gingival injury, and halitosis.⁶ Paediatric dentists are often among the first healthcare professionals to identify such habits and their consequences. Therefore, recognition of underlying psychosocial stressors may facilitate early diagnosis and appropriate referral for behavioural assessment and intervention.¹⁰

A major strength of the present study is the use of the Perceived Stress Scale for Children (PSS-C), which enabled standardized assessment of psychological stress. In addition, the study provides contemporary Indian data regarding the relationship between psychological stress and Pica behaviour, an area where available literature remains limited.

However, certain limitations should be acknowledged. The cross-sectional design prevents establishment of a causal relationship between psychological stress and Pica behaviour. Furthermore, stress assessment relied on self-reported responses and may be subject to reporting bias. Future longitudinal studies with larger sample sizes are recommended to further explore this relationship.

Overall, the findings of the present study indicate that psychological stress is significantly associated with Pica behaviour in children. Early identification of psychosocial stressors and multidisciplinary management may help prevent the dental and medical complications associated with this condition.

Limitations of the Study

1. The present study was cross-sectional in nature; therefore, causal relationship between psychological stress and Pica behaviour could not be established.
2. Stress assessment was based on questionnaire responses and may have been influenced by subjective interpretation.

3. The sample size was relatively limited and region-specific.
4. Nutritional and socioeconomic variables influencing Pica behaviour were not evaluated in detail.

Clinical Significance

Pica behaviour may serve as an important clinical indicator of underlying psychological stress in children. Since oral manifestations and abnormal ingestion habits are frequently identified during dental examination, paediatric dentists play a crucial role in early detection and referral of affected children for psychological evaluation and behavioural intervention.

Conclusion

Children exhibiting Pica behaviour showed considerably higher levels of psychological stress compared to children without Pica behaviour.

Psychosocial factors including fear, peer conflicts, school-related stress, inadequate parental emotional support, loneliness, anger and low energy levels were found to be significantly associated with Pica behaviour. These findings suggest that psychological stress may play an important role in the development and persistence of maladaptive oral and feeding behaviours in children.

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