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Tandon Palak
Ph.D. Scholar, Food and Nutrition, Department of Food Nutrition and Public Health, Ethilend College of Home Sciences, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India

Gupta Alka
Assistant Professor, Department of Foods Nutrition and Public Health, Ethelind College of Home Sciences, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India

Corresponding Author:
Tandon Palak
Ph.D. Scholar, Food and Nutrition, Department of Food Nutrition and Public Health, Ethilend College of Home Sciences, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India

Pica: An eating disorder in children

Tandon Palak and Gupta Alka

Abstract
Pica is an act or habit of eating non-food items such as stone, bricks, chalk, soap, paper, soil etc., It occurs in children who actually start seeing the world through the oral cavity. There are many theories behind it such as iron and zinc deficiency etc. Pica is sometimes a culturally sanctioned practice and may not be pathological. Although pica is the most common eating disorder in individuals with developmental disabilities and children, in this case there was no history of childhood developmental disabilities.

Keywords: Pica, eating disorder, children

Introduction
The name “pica” comes from the Latin word for magpie, a bird known for its large and random appetite. The act or habit of eating things that are not food is called pica. For children, who learn about the world by putting things into their mouths, pica is really fairly common. Unfortunately, some children do not have breakfast at home and they eat paper and other items just because they are hungry and need to survive (Inglish *et al*., 2008). Developmentally, babies - more than elementary school kids - have a period of growth in which they put just about everything they find into their mouths, even their own feet. They usually go on to something more exciting that catches their attention and forget what they had in their mouths. (Inglish *et al*., 2008). The other causes can be iron, zinc or calcium deficiency. Pica occurs variably in patients with iron deficiency. The precise pathophysiology of the syndrome is unknown. Patients consume unusual items, such as laundry starch, ice and soil clay (Roselle *et al.*, 1980). Both clay and starch can bind iron in the gastrointestinal tract, exacerbating the deficiency. (Say *et al*., 1969) [24].

Iron Deficiency
Pica is the craving or eating of items that are not food. There are many reasons why people eat dirt or other non-food items. This practice has been described as “abnormal” and is a very misunderstood problem. Quite often, pica is only seen and recognized when it results in complications that lead someone to obtain medical attention (lesson *et al*., 2007). Such children display signs of iron deficiency, including pallor and thinned nails that are concave and have raised edges, known as spooning of the nails. The small elevations on the child's tongue may be flattened and he may have superficial erosions and fissuring at the angles of the mouth, which frequently signals riboflavin deficiency. Pica is likely to cause effects on teeth. Chewing on stones and bricks can lead to attrition of teeth. An unusual case report, where the tooth showed attrition due to a sand eating habit was reported by (Djemal *et al*., 1998). The likely people to suffer from this disease are pregnant women, iron and zinc deficient children, mentally retarded people, malnourished children. There are possible complications for those who have pica. The eating of non-food substances may interfere with the body's consumption of normal nutritional food. More so, since substances such as paint chips have toxic substances in them, ingesting these things can cause lead poisoning.

Diet plan
The cause is iron or zinc deficiency proper supplements should be given. Although ferrous sulfate is often recommended to treat iron deficiency, frequent problems with the drug including gastrointestinal discomfort, bloating and other distress, make it unacceptable to many patients. Ferrous gluconate, which is roughly equivalent in cost, produces fewer

problems and is preferable as the initial treatment of iron deficiency. Ascorbic acid supplementation enhances iron absorption (Adamson *et al*., 1995). The parent and the child should be asked to make a diary or a daily log of the times when he or she chews on non-food items and when he/she does not. They should also be asked to write down anything that they think is important about each particular instance of pica behaviour.

Presumably, the children initially had simple iron deficiency associated with pica, including geophagia. The soil contained compounds that bound both iron and zinc. The secondary zinc deficiency caused the hepatomegaly and other unusual abnormalities (Roselle *et al.*, 1980). Yet another cause can be associated with this disease. It is high level of lead. Lead exposure is a problem for many children that live or visit for extended periods of time in older houses that have lead-based paint in them (Nicholls *et al*., 1990) [18]. The theories supposedly behind it can be a nutritional theory and a physiological theory. The nutritional theory suggests that appetite-regulating brain enzymes, altered by an iron or zinc deficiency, trigger specific cravings. Yet, the non-food items craved usually do not supply the minerals lacking in the person's body. The physiological theory to explain pica is that eating clay or dirt helps relieve nausea, control diarrhoea, increase salivation, remove toxins and alter odour or taste perception during pregnancy (Lesson *et al*., 2007).

Treatment / Management

Primary prevention should be utilized to identify at-risk patients such as children who live in old homes with lead paint and woman who are pregnant. This could be achieved by screening for the condition among such populations (Hauptman *et al*., 2017) [9]. Strategies should be utilized to decrease exposure to the craved substance, such as reducing access or providing an appropriate substitute with a similar texture. Iron, zinc, and other nutrient supplementation should be provided when a deficiency is identified (Sadeghzadeh *et al.*, 2018). Behavioral and aversive treatment might be effective in patients with mental disabilities (Kelkitli *et al*., 2016) Differential reinforcement is a commonly used strategy to induce different patient responses to pica by redirecting the undesired behaviour to other activities (Albin *et al*., 1997) [1]. There are no medications specifically for the treatment of pica. While there are anecdotal reports about antipsychotic use to reduce pica behaviour, these drugs also cause constipation and other adverse effects. Besides the removal of the substance from the environment, it is important to assess the cultural traditions and beliefs that promote pica behaviour.

Complications

The complications of pica can be categorized according to the type of substance ingested:

Geophagia: Clay ingestion is a very common form of pica. It can lead to constipation, hypokalemia with myopathy, and nutritional deficiencies (Kamboj *et al*., 2015) [12] (Kenna *et al*, 2006) [14]. Clay can also be a source of many infectious agents such as parasites. Lead poisoning can be a serious complication with clay ingestion.

Pagophagia: Ice ingestion could lead to iron deficiency, especially during pregnancy. Other complications include tooth decay and sensitivity (Setime *et al*., 2013) [27].

Amylophagia: Excessive starch consumption has been associated with iron deficiency. It also can cause high blood sugar and obesity due to its high carbohydrate content (Johnson *et al*., 2006) [11]. *Other substances:* Ingested materials can contain a wide variety of toxic contaminants such as lead, mercury, arsenic, fluoride, and many others. Exposure to such items can lead to a wide range of toxic effects such as lead poisoning (Shannon *et al*., 2003) [28]. Lead poisoning could have dire consequences, particularly among women who are pregnant, and high levels can result in seizure (Diawara *et al.*, 2006) [6].

Fetal Toxicity

Pica during pregnancy can have consequences on the growing fetus. There are case reports of intrauterine toxicity due to maternal pica. Lead poisoning has been implicated in long-term neurological disability (Shannon *et al*., 2003) [28]. Maternal geophagy has been associated with childhood motor function delay (Leikin *et al*., 2004) [17].

Discussion

Pica disorder is considered to be an inappropriate behavior characterized by an appetite pattern and craving for non-nutritive substances. Pica usually does not exhibit life-threatening situations, but at times it can create severe complications due to this psychogenic behaviour of an individual. Clinical presentation of pica is highly variable and can be associated with the specific characteristics of the resulting medical conditions and the ingested substances. Weird consumption pattern can lead to various changes in the hard and soft tissues of the oral cavity, which can further lead to ulcerations and pulpal pain (Nayak *et al*., 2017) [16]. Although the etiology of pica is unknown, more recent cases of pica have been tied to the obsession – compulsion spectrum disorder. Numerous hypotheses like psychosocial, biochemical, cultural, socioeconomic and psychodynamic factors explain this phenomenon (Basu *et al.*, 2004) [3]. Deficiencies in iron, calcium, zinc and nutrients (thiamine, niacin, Vitamins B and C) have been associated with pica in some children with malnutrition. Pica may be begning, or it may be associated with life-threatening complications.

Conclusion

Children between the ages of 2 and 7 years of age have been known to have pica. Hence, we conclude, that a thorough medical and personal history of children, helps in a better diagnosis and an appropriate treatment plan. The onset of inhalant use disorder is a major concern in adolescence as missed in routine enquiry (Shah *et al*., 1998) [26]. Inhalant abuse is becoming a public health problem in India due to lack of awareness among the general population as well as health professionals (Reddy *et al*., 2009) [23]. Treatment is generally supportive, and there are no standardized medication regimens or psycho-therapeutic recommendations till date for the treatment of xylophagia and pica. Residential care in a drug-free environment with family support, improving existing personal, social and environmental strengths may help. Complications of pica can include: Malnutrition, intestinal obstruction, intestinal infections or parasites from soil, anemia, mercury poisoning, liver and kidney damage, constipation and abdominal problems (Oski *et al*., 1993) [19]. Fortunately, two very likely causes can be examined through a simple blood test. The first is easy to cure and if either one of them is found to be at fault, steps can be taken to correct the problems. The first of the causes is low iron in the blood (anemia) and the second cause is a high blood level of lead. The blood test for lead and anemia will help you narrow down the cause of eating paper and plastic

(Adamson *et al*., 1997).

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