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PRACA POGLĄDOWA
REVIEW

Pica – strange food preferences: A literature review

Pica – dziwne upodobania żywieniowe: przegląd literatury

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ABSTRACT

Pica, also known as a perverted appetite, is an eating disorder that has been recognized by scientists for decades. It involves consuming inedible objects or edible substances in quantities that are not recommended. It is a highly diverse condition that affects all age groups and can occur in the context of various diseases or physiological conditions. It particularly affects pregnant women and children under the age of 5 years. Pica presents a challenge in terms of both diagnosis and potential treatment. In recent years, there have been increasing reports of pica in clinical practice, but the phenomenon is still greatly underestimated due to the lack of sufficient epidemiological studies and the general acceptance of such behavior. In this article, the authors provide an overview of the current knowledge about the disorder.

KEYWORDS

pica, appetite, pregnancy

STRESZCZENIE

Pica, nazywana inaczej łaknieniem spaczonym, jest znanym naukowcom od dziesięcioleci zaburzeniem odżywiania. Polega na spożywaniu przedmiotów niejadalnych lub jadalnych w ilościach niezalecanych. To bardzo zróżnicowane schorzenie, dotykające wszystkich grup wiekowych oraz mogące wystąpić w przebiegu rozmaitych stanów chorobowych/fizjologicznych organizmu – szczególnie u kobiet w ciąży oraz dzieci do lat 5. *Pica* stanowi wyzwanie zarówno ze względu na diagnostykę, jak i ewentualne leczenie. W ostatnich latach coraz częściej pojawiają się doniesienia o jej występowaniu w praktyce klinicznej, jednak zjawisko to jest wciąż niedoceniane z powodu braku wystarczającej liczby badań epidemiologicznych i powszechnej akceptacji tego typu zachowań. W artykule przedstawiono przegląd aktualnej wiedzy na temat schorzenia.

SŁOWA KLUCZOWE

pica, łaknienie, ciąża

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Introduction

Pica (allotrichophagia or perverted appetite) is defined as the habitual consumption of non-nutritional and inedible substances or of certain foods in abnormal amounts for a period of at least one month. According to the International Classification of Diseases, 11th Revision (ICD-11) classification, it is one of the feeding or eating disorders. The term comes from the Latin word for a magpie – a bird known for stealing inedible objects and searching for food in garbage dumps [1]. The substances consumed by people suffering from pica are very diverse. The most common materials consumed by adults affected by the disorder are clay, soil, starch, and ice. In children, pica most often involves the consumption of wood, hair, dust and sharp objects [2].

Pica is observed in pregnant women, people with low socioeconomic status, and in the course of mental diseases and disorders such as schizophrenia, intellectual disability, or autism spectrum disorder. Among children, it is often associated with intellectual disability and a worse economic and living situation [3]. Pica may also occur as a manifestation of iron deficiency anemia, as well as deficiencies of other nutrients, such as zinc. Today, in some cultures, pica is an acceptable phenomenon, considered normal or therapeutic. Pica can lead to a number of disorders or serious complications, such as nutritional deficiencies, poisoning from toxic substances, gastrointestinal obstruction, parasitic infections, and dental injuries [4]. The diagnosis is based on the patient's clinical history, if the behavior is persistent and results in complications or is potentially dangerous. In some cases, pica is considered a transitional phase (e.g., early childhood or pregnancy), or culturally determined and not requiring treatment. Before making a diagnosis, it is necessary to exclude other medical conditions that may manifest as pica (e.g., food selectivity or nutritional deficiencies) [5]. Food selectivity refers to restricting one's diet to specific edible foods, most often resulting from sensory preferences or a fear of new foods. It does not involve the consumption of inedible substances and usually does not meet the diagnostic criteria for pica unless it leads to deficiencies or significant functional disruptions, in which case it may be classified as Avoidant/Restrictive Food Intake Disorder [6].

Methodology

This paper is a narrative literature review. The aim is to present the current state of knowledge on pica, with a particular emphasis on its causes, prevalence, health effects, and possible treatments. Source materials were searched in the databases PubMed and Google Scholar, and the websites of scientific journals such as *Psychiatria Polska*. The keywords were "pica," "pregnancy," "non-nutritive substance ingestion," "eating disorder in pregnancy," and their Polish equivalents. Scientific publications published between 1975 and 2025, in Polish and English, were included in the analysis. Review articles, original studies, meta-analyses, and case reports were included. After selection based on the titles, abstracts, and substantive value, 25 articles were included in the study.

Epidemiology

Epidemiological data on the prevalence of the disorder in the general population are rather scarce. According to the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5) classification, the prevalence of pica is undetermined due to the lack of studies [7]. According to available sources, one of the risk groups is pregnant and/or postpartum women; therefore, these patients have a higher prevalence of pica. The highest prevalence among pregnant women was recorded in Africa, where it was observed in as much as 44.8% of their population. In second place was North/South America, with a prevalence of 23%, and in third place Eurasia (17.5%). The overall prevalence of the disorder among pregnant women was estimated at 27.8% based on a meta-analysis of 70 studies [8]. The significant prevalence of the phenomenon in Africa is noteworthy. Geophagy (consumption of soil and clay) has been recorded in several African countries, such as Nigeria, South Africa, Ghana, Kenya, and Cameroon. The first reports on the subject appeared in the 1960s. Geophagy is also relatively common in India and rural areas of the United States. In some parts of Africa, geophagy is so popular that these raw materials are distributed for sale. Of particular note is the village of Mashau in South Africa, where the rate of geophagy is as high as 91% [9]. It is believed that geophagy is common among these populations for cultural, religious, and medical reasons.

From a medical perspective, clay ingestion may stem from cravings or may represent an attempt to provide additional minerals such as calcium, iron, magnesium, and zinc [10]. The prevalence of pica among children is difficult to estimate because young children often put inedible products in their mouths, a behavior which is considered a transitional stage in development. The problem often affects children under 5 years of age, mostly boys. A study of 100 Indian children affected by the disorder showed that 76% of them were aged 1–3 years, and the problem occurred mainly in children from families with a low socioeconomic status [11]. The prevalence of the disease decreases significantly among older children. According to the study covering 804 German children with a median age of 10.49 years, 99 exhibited non-nutritional behaviors (12.31% of the study participants), including 40 participants who reported recurrent disorders (4.98%) [12].

One group that is particularly susceptible to a deviant appetite is children on the autism spectrum, with intellectual disabilities and developmental disorders. The prevalence of the disorder among children with autism was estimated at 23.2% (n = 1,426), and among those with developmental disorders at 8.4% (n = 1,735) [13]. Pica is also common among people with intellectual disabilities, whether in medical facilities or society at large. It is stated that pica is the most common nutritional dysfunction for this group. Based on a review of clinical studies, the number of people in care facilities with a tendency to drink ranged from 9.2% to 25%. The most common type of disorder was non-food drinking (eating non-food products); it was more common in people with more severe disabilities. People with milder intellectual disabilities were more likely to suffer from food drinking. In community settings, the proportion of people from the intellectual disability group was very low (0.3%), possibly due to an underestimation of the disorder [14].

Only one study describing the scale of the phenomenon in the Polish patient population is available. It was conducted among 1,696 Polish children aged 15 to 19, at a median age of 16.9 years. Among all the participants, 5.8% (99 individuals) admitted to consuming non-nutritive substances for at least one month, representing 6.8% of women and 4.3% of men. Of this group, 3.2% (55 individuals) consumed starch in the form of paper, tissue paper, and raw flour [15].

Etiology

The reasons for consuming inedible products are very diverse. While the reasons for it have not been clearly determined, there are certain risk factors, one of which is an attempt to replenish nutritional deficiencies. The hypothesis says that geophagy appears when there is a need to compensate for a deficiency of iron, zinc, and calcium. It has been shown that iron deficiency anemia is associated with pica-type behavior (geophagy) and has a frequency of 11%. The vast majority of the patients in one study lost the desire to eat inedible products after the deficiency was replenished [16].

Another theory states that pica is an attempt to protect against harmful microorganisms and substances during intensive cell replication and organogenesis. The protective mechanism would entail coating the intestinal epithelium with what is consumed, preventing the absorption of toxins. According to this theory, pica appears most often in early childhood and pregnancy. It has also been found that pica during pregnancy may be aimed at bringing relief from gastrointestinal complaints. Particular attention is paid to the consumption of clay, which has a documented effect on relieving nausea and vomiting [17].

Another popular theory is the cultural conditioning of the disorder. In areas where pica is particularly common, it is socially accepted. In villages on the Kenyan coast, geophagy is considered ordinary, sometimes desirable, because it can herald pregnancy. At the same time, it is considered a typically female (or childish) behavior, and men who exhibit it are often condemned and considered possessed or addicted to alcohol [18].

Other known risk factors include an acute reaction to stress, low socioeconomic status, child neglect, and epilepsy. It is also possible for pica to occur as a learned behavior [1].

The risk factors, divided into categories, are presented Table I.

Table I. Etiological aspects of pica

Category	Factors
Biological and medical	Attempt to replenish nutritional deficiencies (iron, zinc, or calcium) Iron deficiency anemia Protective mechanism (coating the intestinal epithelium to prevent the absorption of toxins) Gastrointestinal symptoms during pregnancy (e.g., nausea or vomiting) Epilepsy
Psychological and psychiatric	Acute reaction to stress
Environmental and cultural	Cultural conditioning (social acceptance of geophagy) Cultural norms and beliefs (e.g., geophagy associated with pregnancy, considered normal for women and children) Low socioeconomic status Child neglect Learned behavior
Developmental	Early childhood as a high-risk period Pregnancy as a conducive stage

Diagnostics

The diagnosis of pica is established according to international classification systems. Both the DSM-5 and the ICD-11 describe it as persistent consumption of non-nutritive, non-food substances, but there are differences in the criteria (Table II).

A comprehensive assessment of pica should always involve the following diagnostic steps:

- Medical history – includes onset and duration of the disorder, type of substances ingested, frequency of episodes, environmental and cultural background, and family history [19]
- Nutritional history – dietary interview to detect risk factors and possible nutritional deficiencies, especially iron and zinc, which are most commonly associated with pica [4,16]
- Laboratory tests – complete blood count, ferritin, iron, zinc, and lead levels are recommended; toxicology may be necessary in cases of suspected poisoning [16,20]
- Imaging studies – abdominal X-ray, ultrasound, or computed tomography scan can help identify bezoars, intestinal obstruction, perforation, or other mechanical complications caused by ingestion of foreign bodies [21]
- Psychiatric assessment – should evaluate for comorbid mental health conditions such as intellectual disability, autism spectrum disorder, obsessive–compulsive disorder, or schizophrenia, which frequently coexist with pica [19].

A multidisciplinary diagnostic approach is therefore necessary to properly identify the disorder, assess its severity, and exclude complications.

Table II. Comparison of Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5) and International Classification of Diseases, 11th Revision (ICD-11) diagnostic criteria for pica

Feature	DSM-5 [American Psychiatric Association, 2013]	ICD-11 [World Health Organization, 2019]
Definition	Persistent eating of non-nutritive, non-food substances for at least 1 month	Persistent eating of non-nutritive, non-food substances
Age criterion	Developmentally inappropriate (not diagnosed in children < 2 years)	Must be inconsistent with developmental level
Exclusion	Not culturally supported or socially normative	Not part of a culturally accepted practice
Comorbidity	Not explained by another mental disorder unless it is severe enough to need independent treatment	May co-occur with other disorders, but must be clinically significant
Clinical impact	Must be severe enough to require clinical attention	Must cause harm to health or functioning

Treatment

Therapy for pica is always individualized, reflecting the patient's behavioral patterns, medical comorbidities, and environment. A comprehensive plan should combine behavioral therapy, nutritional interventions, and preventive strategies [19]. An important first step involves screening for comorbidities and complications. If iron deficiency is present, supplementation often leads to significant improvement [16]. Referral to psychotherapy is advised in most cases, especially when comorbid psychiatric disorders are suspected [19].

Behavioral interventions such as aversion therapy may be effective in patients with intellectual disabilities. These techniques aim to redirect undesirable behavior – for example, by physically blocking access to the objects in question. However, these interventions have a limited ability to completely eliminate pica. Better outcomes have been observed when aversion is combined with classical conditioning methods, including reinforcement strategies such as rewards and mild punishments [22].

In some patients, pharmacological therapy with selective serotonin reuptake inhibitors (SSRIs) such as fluoxetine and sertraline has been reported to reduce pica behaviors [23].

Preventive strategies should emphasize early screening in high-risk groups (e.g., pregnant women or children with autism spectrum disorder). Interdisciplinary collaboration between physicians, dietitians, and psychologists is essential to manage both the underlying causes and the secondary complications of the disorder.

Complications

Pica may result in a wide range of medical complications, from mild nutritional deficiencies to life-threatening emergencies. Surgical complications are defined as mechanical damage to the gastrointestinal tract, including perforation, obstruction, and massive hemorrhage, caused by the ingestion of sharp or bulky objects [24] (Table III).

Table III. Examples of complications observed in patients with pica

Category	Examples
Nutritional deficiencies	Iron deficiency anemia, zinc deficiency [4,16]
Poisoning / toxic exposure	Lead poisoning (neurotoxicity, behavioral disturbances, IQ reduction) [24,25]; mercury intoxication [24]
Mechanical complications	Intestinal obstruction, perforation, bezoars, bleeding, peritonitis [23]
Parasitic infections	*Trichuris trichiura* and other parasites, especially in coprophagy [22]
Surgical complications	Esophageal rupture, operative removal of foreign bodies, postoperative mortality [23]

IQ – intelligence quotient.

A study by Foxx and Martin [21] demonstrated the presence of intestinal parasites in stool samples from patients with co-occurring coprophagy. In particular, these were whipworms (*Trichuris trichiura*). It was also shown that behavioral intervention and reduction of pica behaviors eradicated the parasites in these patients.

There have been reports of surgical complications of pica, sometimes leading to death. McLoughlin [24] describes the case of a patient who died as a result of swallowing a sharp bone that caused esophageal rupture and massive hematemesis. In this patient, a long history of pica behaviors, such as swallowing screws, was documented. The type items consumed led to repeated surgical interventions.

Another important aspect in connection with pica is the consumption of substances containing heavy metals such as lead – a toxin with a multifaceted effect on the central nervous system. The neurotoxic potential of lead is particularly dangerous for children, where exposure can cause irreversible damage [20]. In adults suffering from pica, behavioral disorders caused by excessive lead exposure have been observed. It has been estimated that each increase of 10 mg/dl of lead in the blood can lead to a 4–7 point reduction in intelligence quotient (IQ) [25].

Conclusions

Pica disorder can be a serious health problem with a multifaceted nature. Consuming an excess of inedible substances can lead to serious complications, both physical and mental. As the literature on the subject shows, pica appears mainly in risk groups, such as pregnant women, people with intellectual disabilities, and children from families with low socioeconomic status. It should not be forgotten that pica can affect people who are not directly related to risk groups. This is an important issue, as it may suggest that the problem of pica is more common than previous studies indicate, and the etiology of this disorder is multifactorial. From a clinical perspective, awareness of pica should influence the everyday practice of physicians, dietitians, and psychologists. Physicians should remain vigilant in screening at-risk groups such as children, pregnant women, and individuals with intellectual disabilities. They should ensure that potential complications and nutritional deficiencies are detected at an early stage. Dietitians play an important role in identifying and correcting deficiencies and in providing patients with guidance on proper nutrition, which can reduce both the risk and severity of the disorder. Psychologists and psychiatrists, on the other hand, are essential in applying behavioral therapy, addressing comorbid psychiatric conditions, and providing long-term preventive interventions. Only through such interdisciplinary cooperation is it possible to improve outcomes for patients with pica and prevent the most dangerous complications [19]. Further research on this phenomenon is necessary, on both its etiology and effective therapeutic methods.

Authors' contribution

Study design – P. Główczyński, P. Księżopolska, M. Gmerek
Data collection – M. Gmerek, P. Główczyński
Manuscript preparation – K. Badura-Brzoza, P. Księżopolska
Literature research – P. Księżopolska, M. Gmerek
Final approval of the version to be published – K. Badura-Brzoza

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