

Robin Webb Corbett, PhD, RN, C,
Cass Ryan, PhD, RD, LDN, and
Sally P. Weinrich, PhD, RN, FAAN

Does It Affect Pregnancy Outcomes?

ABSTRACT

Purpose: To discover the prevalence of pica, the documentation of pica on medical records, and any relationship of pica to pregnancy outcomes in rural socioeconomically disadvantaged pregnant women.

Study Design and Methods: Prospective, descriptive, correlational investigation with 128 women who sought prenatal care from two rural community health agencies. Demographic and sociocultural variables, pica practices, pica substances ingested, and pregnancy outcomes were collected.

Results: Thirty-eight percent of these pregnant women practiced pica. African-American women reported practicing pica more often than other ethnicities. Substances ingested included ice (>1 cup/day), freezer frost, laundry starch, cornstarch, clay dirt, and baked clay dirt. Polypica (ingestion of more than one substance) was practiced by 11 women. Women practicing pica were more likely to have been underweight prior to pregnancy, and smoked fewer cigarettes. Women reporting daily pica practice were significantly more likely to have lower prenatal hematocrits than women who did not practice pica, or who practiced pica less frequently than daily. No specific pregnancy complication was associated with the practice of pica.

Clinical Implications: Pica exists, and might be more common than healthcare providers assume. Although this study did not show specific pregnancy complications associated with pica, other studies have shown anemia and lead poisoning among women who practice pica. It is not clear that patients volunteer information about pica, so it would be helpful if nurses queried patients at each prenatal visit regarding pica practice. Discussion of pica practices should be based on a nonjudgmental model, for pica may have strong cultural implications, and may be practiced for cultural reasons unknown to the nurse.

Key Words: Birthweight; Pica; Pregnancy complications.

Pica is the craving for and ingestion of nonnutritive substances or food substances (Rose, Porcerelli, & Neale, 2000). Pica has been studied for decades, and has been documented in history for centuries (Simon, 1998). Pica seems to be a cultural practice into which elements of stress reduction are embedded (Boyle & Mackey, 1999; Horner, Lackey, Kolasa, & Warren, 1991). According to Jackson & Martin (2000), it is “a complex behavioral phenomenon arising from the interplay of biochemical, hematological, psychological, and cultural factors...” (p. 649). Commonly ingested pica substances include soil/clay (called “geophagia”), starch (cornstarch or laundry starch; “amylophagia”), baking powder, soap, ashes, chalk, paint, burnt match heads, toilet paper, pebbles, dust from venetian blinds, and tire inner tubes (Anderson, 2001; Edwards et al., 1994; Smulian, Motiwala, & Sigman, 1995). “Pagophagia,” or the excessive consumption of ice, is also considered pica (Parry-Jones, 1992; Smulian et al., 1995; Simpson, Mull, Longley, & East, 2000). Pica during pregnancy may be a coping or adaptive behavior, or it may represent a physiological need or “craving” for a nutritive substance by a pregnant woman who is stressed by pregnancy (Reid, 1992; Wiley & Solomon, 1998). Some have theorized that the pica substance ingested may either provide needed trace elements for maternal and fetal development, or may bind with trace elements, making the elements unavailable for fetal development (Johns, 1991; Wiley & Solomon, 1998).

How Often Does Pica Occur?

The prevalence of pica in many different populations has been studied, and the evidence shows that although it occurs quite often, it goes underreported secondary to the woman’s embarrassment in talking about it, or the provider’s lack of attention to asking about it (Smulian et al., 1995). When pregnant women have been questioned about pica, the reported prevalence of pica during pregnancy has been shown to be as low as 14.4% among rural women in Georgia (Smulian et al., 1995), to 44% among Mexican-born women in California (Simpson et al., 2000), to 50% among pregnant women in Zaria, Nigeria (Sule & Madugu, 2001), to as high as 73% in village women in Kenya (Geissler et al., 1999). We have no studies that tell us if, or how often, healthcare providers assess women for pica during pregnancy, but anecdotal evidence suggests that few healthcare providers actually question women about pica.

Who Practices Pica?

Pica seems to occur in women all over the world. Geissler et al. (1999) studied the phenomenon in pregnant women in Kenya, and found that three quarters of all women ate soil on a regular basis, describing soil eating as a practice solely of females, with a strong relationship to fertility and reproduction. The women in Geissler’s study considered the practice a part of their culture, as it was linked to their femininity; they also suffered from anemia, perhaps as a result of the pica. In the United States, the practice of pica

during pregnancy has been linked to several demographic characteristics, occurring more commonly among socioeconomically disadvantaged women, women of African-American heritage, women who practiced pica during childhood or before the pregnancy, women who have strong “cravings” during pregnancy, women whose cultural group endorses pica during pregnancy as important for fertility and femininity, and women whose family members practice pica (Edwards, et al., 1994; Horner et al., 1991; Smulian, et al., 1995; Sule & Madugu, 2001). Pica can begin in childhood, as was found in a study of children with sickle cell disease in Michigan (Ivascu, et al., 2001). They found that 33.9% of their pediatric patients with sickle cell disease reported pica (ingesting paper, foam, and powders), and that there was a significant relationship between low body weight and the practice of pica.

There is one report in the literature about how women who practice pica feel about it. Cooksey (1995) interviewed 300 pica-practicing African-American women in the Midwest during their pregnancies. That qualitative study found that although the women kept the practice secret, pica was a large part of their lives. Much of their time had to be spent obtaining the substance they craved; they feared the effect of the substance on their fetus; they tried to overcome their cravings; some used the substances as “medications”; some altered their food intake because of the pica; and most enjoyed not only the taste of the substance, but also the odor (women in that study described a heightened sense of smell during their pregnancies). Cooksey suggested additional research be done about this topic, and asked nurses to help remove the barriers that pregnant women have to discussing pica with healthcare providers by being accepting and nonjudgmental about the topic.

Is Pica Harmful to the Health of the Woman and/or the Fetus?

Healthcare providers have generally considered pica practice during pregnancy to be harmful, but conflicting evidence exists in the literature about this (Boyle & Mackey, 1999). Various poor health outcomes have been associated with pica, including lead toxicity and illness from other toxins found in the substance eaten (Smulian et al., 1995). Edwards et al. (1994) found that infants born of women who practiced geophagia (eating clay or dirt) had significantly smaller head circumferences than infants whose mothers did not consume these substances. The diets of the pica-practicing women were also deficient in calcium and in iron, and Edwards has hypothesized that pica “may be a mediator of stress, acting through the immune system” (Edwards et al., 1994, p. 960). Reid has suggested that women with geophagia suffer from an interference with the absorption of elemental zinc, iron, and potassium (Reid, 1992).

Of particular concern is the association between pica and maternal and fetal anemia, preeclampsia, colon malfunctions, helminthic infestations, and infant deaths (Barton, Riely, & Sibai, 1992; Horner et al., 1991; Moore & Sears, 1994; Rose et al., 2000; Smulian et al., 1995).

Pagophagia seems to be common among those with pica. The exact mechanism by which pagophagia (excessive ice consumption) interferes with good health is not known, but Parry Jones (1992) reports that it is frequently associated with disordered eating and anemia.

Several authors have published case reports regarding pica in the literature. Barton et al. (1992) reported on one woman who had maternal hypertension, hypokalemia, and elevated liver tests who consumed baking powder during her pregnancy; when the ingestion of the baking powder was stopped, all the symptoms disappeared. Jackson & Martin (2000) studied amylophagia (consuming starch), and found that it is common among African-American women in the southern United States. They reported on two women with gestational diabetes who were “refractory to dietary management,” who both consumed up to one box of cornstarch each day. Once the pica was discovered and stopped, the gestational diabetes in both women disappeared (Jackson & Martin, 2000). Hamilton, Rothenberg, Khan, Manalo, & Norris (2001) described a case of pica in a Hispanic woman in California who had an abnormally high blood lead level, as did her newborn.

Therefore, the purpose of this study was to add to the literature on pica by discovering the prevalence of pica practices in a sample of rural Southern, socioeconomically disadvantaged pregnant women through interviews with the women, to examine their medical records for mention of any pica discovered in interviews, and to find any relationship of pica to pregnancy outcomes, specifically infant birthweight.

Study Design and Methods

This was a prospective, correlational study with a convenience sample consisting of socioeconomically disadvantaged pregnant women attending prenatal care at one of two rural health agencies. Inclusion criteria included ability to speak English, socioeconomic disadvantage (as defined by Medicaid eligibility criteria), and a planned birth at a hospital.

Pica was defined as ingestion of a nonfood substance at least three times during the pregnancy. Ice ingestion (pagophagia), defined as the ingestion of more than one cup of ice a day, was also included as an indicator of pica.

Human subject approval was granted by the University Institutional Review Board.

Of the 161 women receiving care at the study sites, 128 met the study criteria. All subjects scheduled for routine

blood work at each maternity clinic visit were approached to participate in the study. After the women had given informed consent, interviews were conducted during a maternity clinic visit by the investigator using the “Pica History Instrument” as a guide. This instrument includes data related to sociodemographic characteristics, obstetrical history, dietary practices, pica practice, preconceptional weight, weight gain, tobacco and alcohol use, and pregnancy cravings. The pica history instrument was assessed for content validity by a panel of five maternal-child nurses, public health nurses, and nutritionists who are experts in the area of maternal/fetal care. Suggestions from the panel were incorporated into the instrument. Test-retest reliability was conducted with five randomly selected patients at 7-day intervals ($r = 1.0$). Interrater reliability conducted with five randomly selected patients demonstrated 95% agreement between raters. Pregnancy, intrapartal, and infant outcomes were individually analyzed. Pregnancy complications examined included maternal anemia, gestational diabetes, pregnancy-induced hypertension, preterm labor, abruptio placenta, and hyperemesis gravidarum. Birth outcomes were gestational weeks at delivery,

In this setting, 38% of the pregnant women practiced pica. Eleven women reported polypica, the ingestion of more than one nonnutritive substance.

infant birthweight, infant length, Apgar scores, gestational age assessment, physiologic and pathologic jaundice, and respiratory distress.

Descriptive statistics, chi-square tests, and independent *t*-tests were used to analyze the data. Power was calculated predictive of birthweight; a sample size of 100 participants was needed for significance at an alpha of 0.05. For pregnancy complications, the statistical tests used for group comparisons all had a power of 80% of detecting differences of 20% or more between the groups at a 0.05 level of significance.

Results

Demographics of the Sample

The majority of the participants were African-American ($n = 100$, 78.1%), single ($n = 90$, 70.3%), in their early twenties, with a high school education ($n = 63$, 49.2%), unemployed ($n = 71$, 55.5%), and without a religious preference. This was the first pregnancy for 41% ($n = 53$) of the women. Of the sample, 75% were participants in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) program and reported daily prenatal vitamin and iron supplementation consumption (76%).

Table 1. Pica Practice and Frequency (N = 48)

Pica*	Practice	N	%
Type†‡	Ice	36	75
	Polypica	11	22.9
Polypica§	Frost and Ice	5	10.4
	Corn Starch and Ice	1	2.1
	Laundry Starch and Ice	1	2.1
	Freezer Frost, Laundry Starch and Ice	1	2.1
	Corn Starch, Laundry Starch and Ice	1	2.1
	Freezer Frost, Corn Starch, Clay and Ice	1	2.1
	Freezer Frost, Clay, Baked Clay and Ice	1	2.1
Pica Frequency	Low/Moderate	11	22.9
	Daily	37	77.1

*Pica: Ingestion of a nonfood substance at least 3 times during the pregnancy.
 †Pica type: Categorized as none, ice or polypica.
 Ice ingestion: Ingestion of ice in quantities > 1 cup/day.
 ‡One woman of the women practicing pica ingested only laundry starch (2.1%).
 §Polypica: Ingestion of a combination of pica substances; laundry starch, cornstarch, ice, freezer frost, clay and/or baked clay.
 Pica frequency: Categorized as none, low/moderate or high ingestion of the nonnutritive substance. Low: Monthly or less often ingestion of the pica substance. Moderate: Weekly ingestion of the pica substance. High: Daily ingestion of the pica substance.

Prevalence of Pica

A total of 128 women participated in the study interviews; 48 women (38%) were found to practice pica.

Variables Associated With Pica

African-American ethnicity ($n = 42, 89\%$) was the only demographic variable associated with pica practice ($X^2 = 4.5; df = 1; p = 0.03$). No associations were found for gravidity or time in pregnancy when pica began. Table 1 shows pica practice and frequency. Thirty-six women (75%) who reported pica ingested ice only; 11 women (23%) practiced polypica (a combination of ice, freezer frost, cornstarch, laundry starch, clay dirt, and/or baked clay dirt), and one woman ingested only laundry starch (2.1%). The majority (77%) of the women who practiced pica reported daily pica ingestion. Sixty percent ($n = 29$) of women practicing pica identified a family history of pica practice ($X^2 = 4.41; df = 1; p = 0.03$); mothers and sisters were the family members the participants most often reported as practicing pica, with the majority of these women ingesting ice and freezer frost. In addition to mothers and sisters, two male family members were reported as ingesting pica substances.

The amounts ingested by the women varied depending upon the pica substance. Amounts of pica substances ranged from 3 tablespoons of laundry starch ingested three times during the pregnancy to 20 cups of freezer frost each day. When asked why they ingested these substances, women stated these reasons: “crunchiness,” “taste,” “craving,” “enjoyment,” “odor,” “satisfying,” “habit,” “smell of the substance,” “prevention of “marking of the baby” and “the heat.” The majority (41%) of the women who practiced pica said that they had a “craving” for the substance; 22% said they ate it because of the “taste” of the pica substance.

Because the literature shows that it is more common for women with cravings to practice pica, women in this study were also asked about cravings during pregnancy. Of the women practicing pica, 29% ($n = 14$) said they also had special “cravings” before pregnancy; 36% ($n = 17$) reported that cravings occurred just during this pregnancy. Cravings identified by the women practicing pica included a variety of food and nonfood

Table 2. Demographic Variables and Pregnancy Outcomes of Pica and Nonpica Women

Variable/Pregnancy Outcome	Practice		Nonpica	
	Mean	SD	Mean	SD
Age	21.37	4.29	23.1	5.62
Prenatal Hematocrit (gm/dl)	34.2	3.13	35.1	3.36
Preconceptional Weight (lbs)*	139.5	26.9	155.1	46.4
Body Mass Index	23.9	4.42	26.5	7.41
Gestational Weeks at Delivery	39.2	2.05	38.9	2.02
Prenatal Weight Gain*	31.4	15.4	26.9	15.3
Infant Birthweight (g)	3131.4	474.9	3069.4	513.6
Infant Birth Length (cm)	51.0	2.57	51.2	2.96
APGAR (1 min)	8.41	1.52	8.37	1.38
APGAR (5 min)	8.97	.68	8.88	1.26
Tobacco Use (cigarettes/day)*	3.37	1.10	14.7	8.18

* $p < .05$ by t test.

items. Cravings with this pregnancy included watermelon ($n = 5$), ice ($n = 5$), strawberries, spaghetti, and hot dogs. In contrast, the nonpica women stated they craved watermelon, ice cream, pizza, and ice. The only nonfood item reported was ice. No association was noted between cravings and pica practice in this study.

Medical Record and Pica Practice

Although 48 women reported the practice of pica to the investigator in an interview, a review of the medical records demonstrated that 36 of those charts contained no documentation of pica ($X^2 = 18.3$; $df = 1$; $p < 0.01$).

Pregnancy Complications and Outcomes

Compared to women who did not practice pica, women who practiced pica daily were found to have lower maternal hematocrits ($M = 34.2$ g for pica group; $M = 35.1$ g for nonpica group, $p = .151$), although their hematocrits

did not classify them as anemic according to CDC guidelines ($<33.0\%$) (CDC, 2002). This was not a statistically significant difference in hematocrit. However, there was a statistically significant lower hematocrit for women who reported daily pica practice ($M = 34.7$ g) as compared to women who practiced intermittent pica ($M = 32.6$ g, $p = 0.04$). Women practicing polypica ($M = 32.7$ g) also had lower hematocrits than women ingesting ice ($M = 34.6$ g, $p = 0.08$), although this was not a statistically significant difference.

Anemia was not associated with pica practice, pica frequency, pica substance, pagophagia, or polypica. However, anemia was present in 32% of the total sample of women (including both pica and non-pica). Of the 48 women who practiced pica, 18 were anemic ($<33\%$ hematocrit); of the 87 women who did not practice pica, 23 were anemic. This was not a statistically significant difference.

Regarding alcohol and tobacco use, most women practicing pica did not report alcohol use, but significant differences were found between the two groups (pica and nonpica) specific to tobacco use. Women who practiced pica reported fewer cigarettes smoked per day (3.37 vs. 14.7, $p < .05$).

The mean infant birthweight of the sample was 3093 g (range = 1777–4390 g). All low-birthweight (1500–2499 g) infants were African-American ($C2 = 4.09$; $df = 1$; $p = 0.04$). Birthweights for African-American infants ($M = 3007$ g) were significantly lower than for white infants ($M = 3414$ g, $t = 3.93$, $p < 0.01$). Women practicing pica de-

livered infants with higher mean birthweights, although not statistically significantly higher ($M = 3131$ g for pica; $M = 3069$ g for nonpica, ($t = .680$, $p = 0.49$). No significant association was found between birthweight, gestational age, pica substances, or the practice of polypica. Analysis also determined that the higher infant birthweights of women practicing pica was not associated with diabetes mellitus in pregnancy, gestational diabetes, prenatal weight gain, multiple gestations, or illicit drug use.

No individual pregnancy complication was associated with pica practice, frequency of pica, or type of pica practice. Specific pregnancy complications such as gestational diabetes, pregnancy hypertension, and urinary tract infections were not associated. No significant associations were noted between pica practice and intrapartum and infant outcomes or complications. Pregnancy complication was associated with pica practice, frequency of pica, or type of pica practice. Specific pregnancy complications such as gesta-

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Clinical Implications

The prevalence of pica in this population was 38%, a finding that supports prevalence rates in previous research (Smulian et al. 1995; Geissler et al. 1999). This reinforces the high prevalence of this disorder, and suggests that questions about the presence of pica should be raised routinely in prenatal care. Of concern was the fact that a review of the medical records of the 48 women found in interviews to practice pica revealed no mention of pica in 36 of those charts. This either suggests that the women were not asked about pica during their routine prenatal care, or that the provider did not note the pica in the record. However, neither option is acceptable, because understanding that pica occurs is an important part of comprehensive care, and noting it in the medical record gives other providers the opportunity to assess and intervene. Nurses caring for pregnant women should use the results of this study to help teach other providers about the high prevalence of pica in some populations, the essential nature of asking about pica, and the importance of documenting it on the medical record.

Previous literature has reported harmful outcomes with the practice of pica in pregnancy (Barton et al., 1992; Horner et al., 1991; Jackson & Martin, 2000; Moore &

PICA Assessment Strategies

Patient centered: Wait for the patient to reply and listen to the content of the message, even if the patient is documented as nonpica—ask your patients if they practice pica at each prenatal visit.

Ice: The most common item ingested, but ask your patients if they crave or ingest: ice, freezer frost, laundry starch, cornstarch, clay dirt, baked clay dirt, or other items.

Communication: Monitor verbal and nonverbal, nurses nonacceptance of the item ingested is communicated and may block further communication.

Anemia: For patients with low maternal hematocrits, explore the practice of pica.

Sears, 1994; Rainville, 1998; Simpson et al., 2000; Smulian et al., 1995). Although the exact mechanism by which pica during pregnancy modifies nutritional metabolism has not been described, it is clear that women with marginal nutritional status may be at greater risk of poor pregnancy outcomes. This study furthers our knowledge about pica, for it examined pica by its frequency and found that pregnant women who practiced pica daily had lower hematocrit levels than women not practicing pica or practicing pica intermittently, although these hematocrit levels were not low enough for a diagnosis of anemia. However, lower hematocrits could foreshadow poor nutrition and future anemia, so it is important that nurses ask pregnant women about pica during prenatal encounters. This questioning should also include assessment of ingestion of ice and freezer frost, items perhaps not considered abnormal by the patients, for the literature clearly tells us that women with pagophagia have compromised health status, including lower pre-conceptual weight and poor nutrition.

This study also determined that frequency of pica practice influences outcomes. Therefore, nurses should not only assess women for pica practice, but also should determine the frequency of the practice, and document women's pica practices in the medical record. In earlier studies, many pregnant women reported ingesting clay (geophagia), baked clay, and freezer frost (Smulian et al., 1995; Rehn & DeSimone, 1991). This was not found in this study, but the ingestion of ice, a more socially acceptable pregnancy "craving," was found both in this study and in others (Edwards, et al., 1994; Rainville, 1998; Simpson et al., 2000). However, nurses need to be aware that while the majority of women ingested ice, some women continued to eat laundry starch, cornstarch, clay dirt, and baked clay, so specific questions should be asked about those substances.

In contrast to Rainville's investigation (1998), women in this study who practiced pica smoked fewer cigarettes than the non-pica group. The reasons for this finding are unknown. However, it may be that the practice of pica serves as a stress-reduction mechanism during pregnancy. Although we have no scientific evidence to support this assumption, it could be that ice ingestion may serve as a substitute for cigarette smoking.

The entire issue of pica warrants further investigation in the literature. In particular, the relationship of specific picas (e.g., pagophagia, geophagia) to individual pregnancy complications (e.g., pregnancy-induced hypertension, preterm labor) needs to be explored more fully. Further investigation is also needed to examine the relationship of the practice of pica to maternal/fetal nutritional bioavailability. In addition, pica substances should be analyzed for their nutritional content; in particular, ice needs to be analyzed to

determine if the freezing process changes the nutritional composition of water. Studies should also investigate the association of pagophagia (ice ingestion) to seasonal variations.

Nurses and all healthcare professionals need more education about the practice of pica, particularly among high-risk pregnant populations. Since the relationship between anemia and pica remains unclear, it is particularly important for nurses to discuss this topic with their patients, encouraging them to discuss pica and to take their daily prenatal vitamin. Patient questioning regarding pica should be open, directive, and culturally sensitive. Establishing a trusting relationship with patients and allowing adequate time for them to verbalize their concerns and share information is an important aspect of nursing prenatal assessments. When listening to patients discuss substances they may have ingested, it is vital that nurses communicate a nonjudgmental attitude. These pica practices may be practiced by many family members, and the nurse should help the patient understand why these substances may be harmful to ingest in pregnancy.

Because many of the cravings identified both by women who practiced pica and those who did not are of limited nutritional value, it is important that the nutritional assessment of pregnant women more fully explore their cravings and the relationship of cravings to dietary intake and pregnancy outcomes. At each prenatal visit, the nurse should question patients about pica, as pica can begin at any time during the pregnancy. Working with patients to discover what they are eating, and helping them to substitute foods with nutritional value, can be a part of a nursing care plan that results in a positive pregnancy outcome. ❖

Robin Webb Corbett is an Associate Professor, School of Nursing, East Carolina University, Greenville, NC. She can be reached at East Carolina University, School of Nursing, Rivers Building, Greenville, NC 27858 (e-mail: corbettr@mail.ecu.edu).

Cass Ryan is a Nutritionist, Kansas University Medical Center, Kansas City, KS.

Sally P. Weinrich is a Professor, School of Nursing, University of Louisville, Louisville, KY.

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References

- Anderson, M. (2001). Pica: Is it being overlooked? *Physician Assistant*, 25, 19-25.
- Barton, J. F., Riely, C. A., & Sibai, B. M. (1992). Baking powder mimicking preeclampsia. *American Journal of Obstetrics & Gynecology*, 167, 98-99.
- Bronstein, E. S., & Dollar, J. (1974). Pica in pregnancy. *Journal of Medical Association of Georgia*, 67, 332-335.
- Boyle, J. S., & Mackey, M. C. (1999). Pica: Sorting it out. *Journal of Transcultural Nursing*, 10(1):65-68.
- Cooksey, N. R. (1995). Pica and olfactory craving of pregnancy: How deep are the secrets? *Birth*, 22(3):129-137.
- Edwards, C. H., Johnson, A. A., Knight, E. M., Oyemade, U. J., Jackson Cole, O., Westney, O. E., et al. (1994). Pica in an urban environment. *Journal of Nutrition*, 124 (Suppl), 954S-962S.
- Geissler, P. W., Prince, R. J., Levene, M., Poda, C., Beckerleg, S. E., Mute-mi, W., et al. (1999). Perceptions of soil-eating and anemia among pregnant women on the Kenyan coast. *Social Science and Medicine*, 48(8):1069-1079.
- Horner, R. D., Lackey, C. J., Kolasa, K., & Warren, K. (1991). Pica practices of pregnant women. *Journal of American Dietetic Association*, 1,34-38.
- Institute of Medicine. (1990). *Nutrition during pregnancy*. Washington, DC: National Academy Press.
- Ivascu, N. S., Sarnaik, S., McCrae, J., Whitten-Shurney, W., Thomas, R., & Bond S. (2001). Characterization of pica prevalence among patients with sickle cell disease. *Archives of Pediatric and Adolescent Medicine*, 155(11): 1243-1247.
- Jackson, W. C., & Martin, J. P. (2000). Amylophagia presenting as gestational diabetes. *Archives of Family Medicine*, 9(7):649-652.
- Lacey, E. P. (1990). Broadening the perspective of pica: Literature review. *Public Health Reports*, 105, 29-35.
- Moore, D. F., & Sears, D. A. (1994). Pica, iron deficiency, and the medical history. *American Journal of Medicine*, 97, 390-393.
- Parry-Jones, B. (1992). Pagophagia, or compulsive ice consumption: A historical perspective. *Psychological Medicine*, 22(3): 561-71.
- Rainville, A. J. (1998). Pica practices of pregnant women are associated with lower maternal hemoglobin level at delivery. *Journal of American Dietetic Association*, 98, 293-296.
- Rehm, S. R., & DeSimone, P. A. (1991). A proposed mechanism for card-board-induced iron deficiency anemia. *American Journal of Medicine*, 90, 768-769.
- Reid, R. M. (1992). Cultural and medical perspectives on geophagia. *Medical Anthropology*, 13, 337-351.
- Rose, E. A., Porcerelli, J. H., & Neale, A. V. (2000). Pica: Common but commonly missed. *Journal of the American Board of Family Practitioners*, 13(5):353-358.
- Schwartz, I. (1990). Low-birthweight effects of demographic and socioeconomic variables and prenatal care in Pima County, Arizona. *Western Journal of Medicine*, 152, 725-728.
- Smulian, J., Motiwala, S., & Sigman, R. (1995). Pica in a rural population. *Southern Medical Journal*, 88, 1236-1240.
- Simon S. L. (1998). Soil ingestion by humans: A review of history, data, etiology with application to risk assessment of radioactively contaminated soil. *Health Physiology*, 74(6):647-672.
- Simpson, E., Mull, J. D., & East, J. (2000). Pica during pregnancy in low-income women born in Mexico. *Western Journal of Medicine*, 173, 20-24.
- Sule, S., & Madugu, H. N. (2001). Pica in pregnant women in Zaria, Nigeria. *Nigerian Journal of Medicine*, 10(1):25-27.

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Perception Care Resource Center
www.b4pregnancy.org
 Centers for Disease Control
www.cdc.gov/nccdphp/drh/srv_prams.htm

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Pica in Pregnancy: Does It Affect Pregnancy Outcomes?

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Registration Deadline: June 30, 2005

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CE TEST QUESTIONS

General Purpose

To present registered professional nurses with information on a study that investigated pica and its relationship to pregnancy outcomes in rural, socioeconomically disadvantaged pregnant women.

Learning Objective

After reading this article and taking this test, you will be able to:

1. Outline the background information helpful in understanding the phenomenon of pica.
2. Discuss the various research studies that explore the practice of pica during pregnancy.
3. Describe the results of the authors' study of pica as practiced by rural socioeconomically disadvantaged pregnant women.

Questions

1. **Pica is apparently a cultural practice that carries with it an implication of**
 - a. caloric satisfaction.
 - b. weight reduction.
 - c. stress reduction.
2. **Amylophagia is the excessive consumption of**
 - a. ice.
 - b. starch.
 - c. soil.
3. **Pagophagia is the excessive consumption of**
 - a. ice.
 - b. starch.
 - c. soil.
4. **In the U.S., pica is especially prevalent among pregnant women**
 - a. who lack other cravings during pregnancy.
 - b. whose family members practice pica.
 - c. of Asian descent.

5. **A study of children with sickle cell disease indicated that they tend to ingest**

- a. paint.
- b. paper.
- c. ashes.

6. **In their study on how women who practice pica feel about it, Cooksey et al. (1995) found that the women especially enjoyed**

- a. the odor of the ingested substances.
- b. keeping the practice a secret.
- c. the beneficial effects they believed it would have on their babies.

7. **Edwards et al. (1994) determined that geophagia during pregnancy resulted in**

- a. maternal and fetal anemia.
- b. fetal demise.
- c. infants with smaller head circumferences.

8. **Research by Parry Jones (1992) showed that pagophagia during pregnancy is associated with**

- a. hypokalemia.
- b. anemia.
- c. gestational diabetes.

9. **According to Jackson et al. (2000), amylophagia during pregnancy is associated with**

- a. hypokalemia.
- b. anemia.
- c. gestational diabetes.

10. **Of the subjects of the authors' study of socioeconomically disadvantaged pregnant women, how many practiced pica?**

- a. 14%
- b. 38%
- c. 44%

11. **Which subjects in this study had the lowest mean hematocrit levels?**

- a. those who practiced polypica
- b. those who practiced pagophagia
- c. those who did not practice pica

12. **The authors concluded that**

- a. pica is a rare disorder and does not warrant routine screening of pregnant women.
- b. the medical records of most pica-practicing subjects included no mention of the disorder.
- c. pica is associated with multiple complications of pregnancy.

13. **Compared with the women in the authors' study who did not practice pica, those who practiced pica reported**

- a. more weight gain.
- b. more alcohol use.
- c. fewer cigarettes smoked per day.

14. **In the authors' study, increased frequency of pica had a significant effect on maternal**

- a. hematocrit.
- b. blood pressure.
- c. weight gain.

15. **When counseling a pregnant woman who practices pica, the authors recommend making sure that she**

- a. takes prenatal vitamins daily.
- b. stops the practice immediately.
- c. knows that she is harming her baby.

CE Enrollment Form

Pica in Pregnancy: Does It Affect Pregnancy Outcomes?

A Registration Information:

Last name _____ First name _____ MI _____
 Address _____
 City _____ State _____ Zip _____
 Telephone _____ Fax _____ email _____
 Registration Deadline: June 30, 2005
 Contact Hours: 1.5
 Fee: \$12.95

LPN RN CNS NP CRNA CNM other _____
 Job Title _____ Specialty _____
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 Are you certified? Yes No
 Certified by _____
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- | A | B | C | A | B | C | A | B | C | A | B | C |
|--------------------------|-----------------------|-----------------------|--------------------------|-----------------------|-----------------------|---------------------------|-----------------------|-----------------------|---------------------------|-----------------------|-----------------------|
| 1. <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | 5. <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | 9. <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | 13. <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 2. <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | 6. <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | 10. <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | 14. <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 3. <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | 7. <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | 11. <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | 15. <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
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C Course Evaluation*

- | | A | B |
|---|------------------------------|-----------------------------|
| 1. Did this CE activity's learning objectives relate to its general purpose? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
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