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DEPARTMENT OF REGISTERD GENERAL NURSING

DIPLOMA PROGRAMMES

KNOWLEDGE, ATTITUDE AND PRACTICES IN REGARD TO GEOPHAGIA AMONG PREGNANT WOMEN IN BEREKUM MUNICIPALITY IN THE BONO REGION OF GHANA

SUBMITTED BY:

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AFFILIATED TO KNUST, KUMASI

AUGUST 2022

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DECLARATION

We hereby declare that this submission is our own work towards the Diploma in General Nursing and that, to the best of our knowledge, it contains no material previously published by another person nor material which has been accepted for the award of diploma of the University, except where due acknowledgement has been made in the text.

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ABSTRACT

Background; This research was carried out in Berekum Mnunicipality in the Bono region of Ghana to assess the knowledge, attitudes and practices of pregnant women with regards to geophagia in Berekum and to determine the factors which can influence the knowledge, attitudes and practices of geophagia among pregnant women.

Basic design of the study; Utilizing a cross sectional descriptive survey was the research design.

Sampling technique; A non-probability Convenience sampling technique was used to select 400 women attending antenatal clinic at Berekum hospitals and clinics.

Data collection tool; A validated structured questionnaires were used as means for data collection for the respondents using convenience sampling method. Self-administered questionnaires were used for data collection. About 379 (94%) of the questionnaire was filled and returned.

Major findings; The major findings were that, 53% of the total number of respondents said Geophagia poses health benefits during pregnancy, while 47% said it does not.

The findings of this study accentuate the fact that although majority 84% (n=318) of the respondents are aware that pregnant women are more vulnerable to geophagia than other persons as against 16% (n=61) who are not. This arguably indicates a high awareness of the association between pregnancy and geophagia disorder among the respondents. Due to the fact that pregnancy come with a lot of extreme physiological changes the following reasons were ascertained; craving (50.7%), smelling (38.2%), cultural practices (33.1%), to stop nausea and vomiting (32.4%) and some also consume pica as a food substance as life giving (10.3%). Also, 23% (n=86) of the respondents are aware that geophagia disorder is dangerous to the health of the pregnant mother, while 77% (293) are not aware of this whilst 28% (n=109) of the respondents

are aware that geophagia disorder is dangerous for the child in the womb, while 69% (n=262) are not aware. This suggests that, majority of the respondents do not view geophagia disorder as constituting health risk to both the mother and the child. Most of the respondents consume earthy-materials twice daily leading to less of its complications being exhibited. It is remarkable that up to 36.7% failed to seek medical attention upon experiencing geophagia disorder. When the respondents that gave no answer were eliminated, those that do not sought for medical attention was 69.5%, which is the majority. This high percentage might have resulted from the fact that most of the respondents did not appreciate the risk posed by geophagia disorder to the health of the mother and child

Conclusions; The major opinions advanced by the respondents according to reasons that halt the indulgence of geophagia practices conclude to the fact that, a solution to these factors should be, Calling upon Public health authorities to work closely with community groups so they design bottom up, culturally competent interventions. It is recommended that follow up cohort studies can be done on the consumers to check whether they were only ingesting soil during pregnancy or have continued after giving birth. And also, educating and creating of awareness to women in their early stages of pregnancy on the dangers of soil consumption and also reinforce it anytime they come for antenatal visit in order to facilitate its full indulgence in prenatal/antenatal care.

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CHAPTER ONE

INTRODUCTION

1.0 Background of the study

As health problems present challenges to the existence of man, certain measures are proffered to curtail their effects. One of such measures is communication which lies at "the heart of public health objectives; including disease prevention, health promotion and quality of life" (Badr, 2009). As effective communication for health must be tailored to the audience and the situation (Beato & Jana, 2010) research into health communication seeks to refine communication strategies to inform people about ways to enhance health or to avoid specific health risks (Centre for Disease Control and Prevention, 2015).

However, the puzzling phenomenon of Geophagia also known as pica (Singh, 2013) which may not have been a focus in the field of health communication in Ghana also presents health risks which are also to be communicated in a bid to increase audience knowledge and awareness; influence behaviour and attitude, correct misconceptions, and increase demand for health support for suspected cases of harmful pica. Pica (or corrupt appetite) derives from the Latin word for "magpie", a species of bird that feeds on whatever it encounters. It has been associated consistently with "manifestations of false or craving appetite and the deliberate ingestion of bizarre selection of foods, non-nutritive substances and non-food items" (Parry-Jones, 1991). It is a feeding disorder in which the victim craves to consume inedible substances such as paper, charcoal, sand, etc. Pica has been categorized into many types; Amylophagia: A compulsive consumption of purified starch in excessive amounts. Coprophagy: An eating disorder characterized by eating feces. Geophagy: It is an abnormal craving for soil-like or earthy

substances clay, chalk, soil etc. It is common among children and pregnant women. Hyalophagia: Pica disorder in which the person eats glass objects. This is usually used as a performance technique by performers. Mucophagia: A disorder of feeding on the mucus of the invertebrates and fishes. Pagophagia: A form of pica in which the person consumes excessive amounts of ice cubes or iced drinks. This condition is associated with the iron deficiency. Self-cannibalism: It is the self-eating practice. Self-cannibaliam is also called autocannibalism or autosarcophagy. Trichophagia: This condition is characterized by eating hair, mostly one's own. The long hair is first chewed without pulling them from the scalp and them swallowed. Sometimes the patient might also eat other people's hair. Urophagia: The practice of consuming urine. The reason for this might be health concerns as urine is regarded, by some, earthy and with healing properties. Xylophagia: This kind of Pica disorders involves the consumption of wood. People usually eat things made of wood like pencil, paper, wood bark etc. This is seen mostly among children. With the purpose of this study, geophagia was what the content of this study stem at and emphasized.

Geophagy, the deliberate consumption of soil, is prevalent among pregnant women across Sub-Saharan African countries, such as Kenya, Ghana, Rwanda, Nigeria, Tanzania, and South Africa (Al-Rmalli., Jenkin., Watts., Haris., 2010; Knudsen., 2001). The deliberate ingestion of earthy or soil-like materials such as clay and chalk is referred to as Geophagy (Crawford and Bodkin 2011). It is common among animals and also in humans but most often in rural societies among pregnant women and children. 40% of women among African descendants practice geophagy (George and Ndip, 2011). People practice geophagy for different reasons. In South Africa, many pregnant women practice geophagy due to cravings, taste and smell of the clay material (George and Ndip, 2011). The prevalence of geophagy varies between and within countries, but is estimated between 10-75% (Njiru., Elchalai., & Paltiel, 2011; Ngozi, 2008; Antelman., et al., 2000). It is likely that underreporting of geophagy occurs, for a variety of

reasons, including embarrassment regarding the behavior, lack of knowledge and sensitive questioning on the part of investigator inquiring about geophagy and differing perceptions, beliefs, and cultural norms (Corbett., Ryan & Weinrich, 2003; Young, 2010).

The etiology of geophagy remains elusive. Both physiologic (e.g., mineral deficiency or hunger) and psychological (e.g., craving, obsessive-compulsive spectrum disorder) models have been proposed (Knudsen., 2001; Hergüner., Ozyildirim & Tanidir 2008). Cultural and socioeconomic factors have also been identified as influencing the practice of geophagy, thereby highlighting its complex and little understood nature (Young, 2010).

Geophagy has been observed throughout the world – everywhere from sub-Saharan Africa to Europe, Asia to Australia. In the U.S., geophagy has figured into the culture of various indigenous cultures and to the past (and present) of the South, where experts believe native Africans who were brought as slaves introduced the practice. Humans regularly ingest dirt in trace amounts in everyday life, but most Western societies declare a threshold at which deliberate consumption is treated as a symptom of physiological or psychiatric disease (called pica). Other Americans, such as the indigenous Pomo of Northern California used dirt in their diet—they mixed it with ground a corn which neutralized the acid. Although geophagy is often met with disgust or dismissed as prehistory or pathology, it exists in many cultures around the world as a healthful if not vital practice.

Nevertheless, around the globe people do practice geaophagy as part of their cultural practices, in the believe that, eating dirt or clay can: help improve stomach issues, soften skin or alter skin tone, offer protective benefits during pregnancy and prevent or treat illness by absorbing toxins Hippocrates was the first to describe geophagia. Other early medical texts also mention the practice of eating earth to help stomach troubles and menstrual cramps. Some practitioners believe that the soil or clay affords nutrients and minerals, such as iron, calcium, and

potassium, that may otherwise be absent from the diet. Others take it medicinally to soothe gastrointestinal disorders, to detoxify the body, or to boost the immune system. Poverty seems to be a widespread correlate of the practice; soil acts as an indigestible placeholder when food is scarce. Geophagy is not without risk, however, as excessive consumption of earthen materials can result in vitamin deficiencies, infectious disease, lead poisoning, and bowel impaction. People around the world eat clay, dirt or other pieces of the lithosphere for a variety of reasons. Commonly, it is a traditional cultural activity that takes place during pregnancy, religious ceremonies, or as a remedy for diseases. Most people who eat dirt live in Central Africa and the Southern United States. While it is a cultural practice, it also fills a physiological need for nutrients.

In Africa, pregnant and lactating women are able to satisfy the very different nutritional needs of their bodies by eating clay as the commonly ingested in Africa contains important nutrients such as phosphorus, potassium, magnesium, copper, zinc, manganese, and iron. Often, the clay comes from favored clay pits and it is sold at market in a variety of sizes and with differing content of minerals. After purchase, the clays are stored in a belt-like cloth around the waist and eaten as desired and often without water. The "cravings" in pregnancy for a varied nutritional intake (during pregnancy, the body requires 20% more nutrients and 50% more during lactation) are solved by geophagy.

The tradition of geophagy spread from Africa to the United States with the institution of enslavement. A 1942 survey in Mississippi showed that at least 25 percent of the school children habitually ate earth. Adults, although not systematically surveyed, also consumed earth. A number of reasons were given: earth is good for you; it helps pregnant women; it tastes good; it is sour like a lemon; it tastes better if smoked in the chimney, and so on. Despite its importance, European medical texts from the 16th and 17th centuries mention geophagia that appeared to

occur with chlorosis, or “green sickness,” a type of anemia. Throughout history, geophagia has been noted to occur more among pregnant women or in times of famine (Rosenberg 2020). Unfortunately, many African Americans who practice geophagy (or quasi-geophagy) are eating unhealthy material such as laundry starch, ashes, chalk, and lead-paint chips because of psychological need. These materials have no nutritional benefits and can lead to intestinal problems and disease.

Geophagy has been observed among children and pregnant women in rural cultures across Sub-Saharan Africa, Europe, and South Asia from antiquity. Indigenous peoples of the Americans are also reported to have consumed soil. West Africans brought the practice to the American South during the slave trade. Whether slaves intended to supplement their diet or to induce illness is uncertain, but plantation owners reviled the seemingly harmful practice. Repeat offenders were often made to wear a muzzle to keep them from indulging again.

Geophagy was taboo in early American society primarily because it was believed that intestinal parasites, a common affliction among young children, were acquired through eating dirt. Conversely, the desire to consume dirt was deemed a symptom of hookworm disease, which was prevalent in Arkansas and other parts of the South in the nineteenth and early twentieth centuries wherever sewage ran freely in the streets and children often went without shoes. The 1880 Mortality Schedule for Prairie and Spring Hill townships in Drew County lists simply “eating dirt” as the cause of death for Mary Towson, a seven-year-old African-American girl. Aversion to geophagy has remained largely unchanged due to the aforementioned risks associated with the practice, yet there has been a resurgence in research surrounding it in conjunction with the “hygiene hypothesis”—the theory that exposure to infectious disease is integral to a child’s immunologic development. While ingestion of sand or soil may cause gastric pain and chewing of ice result in abnormal wear of teeth, consuming lead can lead to consequences as severe as

kidney damage and mental retardation (Encyclopaedia of Mental Disorders, 2015). Among those believed to be at significant risk of pica disorder(geophagia) are pregnant women, and this condition naturally poses some danger to the lives of both the mother and child (Parry-Jones & Parry-Jones, 1992; Singh, 2013). This creates the need for proper knowledge and awareness among this category of people which would place them in good stead for proper practice vis-à-vis this health disorder.

1.1 Statement of problem

Woymodt and Kiss (2002) observed that it is "environmentally and culturally driven" among others. That is to say, geophagia is part of the cultural norms of the people who practice it. Due to the inference that those who practice geophagia are perhaps suffering from mental infirmities, the question of capacity begs to be answered. When capacity is viewed from the western medico-legal and ethical point of view in the context of what constitute good nutrition and good health-seeking behavior, it does not address the question as to whether those practicing geophagia do in fact have the capacity to discern good from bad (Sivalingam, 2011; Woywodt & Kiss, 2008). The question of capacity arises from the Western industrial medico-legal ethics. Sivalingam (2011), Western ethical framework places the individual as the central entity around whom all other activities revolve. The concept of autonomy naturally arose from the centrist positioning of the individual as a free entity in society whose actions are motivated by his or her own desires, subject to the limitations placed by societal maxims and rules. Holland (2007), Unlike capacity/autonomy in the western world, in Ghana and many developing nations, the question of capacity is considered a communal value. It does not evolve out of a single individual. Sivalingam (2011) argued that in Malaysian culture, the family's autonomy supersedes that of the individual. There is obviously a conflict between the western ethical precepts ofautonomy and

capacity and the understanding for these concepts as held in the traditional and cultural societies. Holland, (2007); Castellano, (2004); Sen (1992) and Nussbaum (1993) defined capacity as a“person‟s ability to do valuable acts and reach valuable state of being”.

Geophagia represents a real health risk ranging from minor disorders to some severe health conditions (Parry-Jones & Parry-Jones, 1992; Singh, 2013; Encyclopaedia of Mental Disorders, 2015). While remarkable efforts have gone into health campaigns regarding phenomena like HIV/AIDS, cancer, malaria, tuberculosis, etc, geophagia disorder appears not to have gained such attention, particularly in a clime like Ghana. Consequently, it would also appear that not much has been done by way of studies to develop empirical data and theoretical formulations on people’s knowledge, attitude and practice in regard to geophagia. This situation definitely would necessitate some worry as its likely implication is that knowledge and awareness of geophagia disorder would be low among the population; this way making them more vulnerable to the phenomenon. In view of these problems and also due to the fact that the researchers are not aware of any previous study that assessed the knowledge, attitudes and practices of pregnant women with regards to geophagia in Berekum, the researchers therefore decided to undertake this study to assess the knowledge, attitudes and practices of pregnant women with regards to geophagia in Berekum,determine the factors which can influence the knowledge, attitudes and practices of geophagia among pregnant women.

1.2 Purpose of the study

Our review clearly shows that geophagia disorder has been continuously subjected to research. However, the studies are largely foreign (and not Ghanaian) and have focused on the prevalence and nature of the disorder itself and not on the communication aspect of it. In other words, there is still need to inquire into the phenomenon of geophagia from the perspective of health communication. This represents the gap which this study intended to fill.

1.3 General objectives

The purpose of this study was to assess the knowledge, attitude and practice in regard to geophagia among pregnant women in Berekum Municipality in the Bono Region.

1.4 Specific objectives

In precise terms, the research pursued the following objectives:

1. To ascertain the level of knowledge of geophagia disorder as associated with pregnancy among pregnant women.
2. To determine the attitudes of pregnant women in regard to geophagy practices.
3. Discover how much these women are aware that geophagia disorder constitute health risk for both the mother and the child; and
4. To determine whether these women take measures against geophagia disorder when they experience it.

1.5 Operational Definitions

This section of the chapter expresses the under listed words as they are conceived in the literature and how they (words) are applied in the context of this report.

1. Gastrointestinal: Relating to the stomach and intestine

2. Enslavement: The state of being slave

3. Cognitive: Of or being or relating to cognition

4. Psychological: Mental or emotional as opposed to physician in nature

5. Psychiatry: The branch of medicine dealing with the diagnosis and treatment of mental disorders

6. Neurological: Of or relating to or practicing neurology

7. Nutrient: Any substance that can be metabolized by an animal to give energy and build tissues.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

Pica has been described as the eating disorder characterized by the persistent ingestion of non-nutritive substances for a period of at least one month, at an age in which the behaviour is considered inappropriate (American Psychiatric Association, 1994). Though pica has been described as eating disorder (Gupta & Gupta, 2005) some other scholars are of the view that it is not a disease or disorder but a behaviour that results from the interaction of biological, environmental and psychological factors (Bhatia & Singhal, 2012).

The aetiology of pica is unknown (Bhatia & Kaur, 2014), however, efforts to define and explain the phenomenon have come through developmental studies, psychodynamic theories, need-state hypotheses that propose nutritional deficit and homeostatic compensation, socio-cultural determinants that involve ethnic group traditions and beliefs related to rites of passage, health, and fertility, as well as the consequences of erratic reinforcement in a chaotic unstructured environment (Blinder, Goodman & Henderson, 1988).

Though puzzling, the phenomenon of Pica, has been recognized and described since ancient times and have been observed in ethnic groups worldwide; in both primitive and modern cultures (Singh, 2013). From a psychiatry point of view, geophagia has been classified as a form of pica. The term Pica, and its older form “cissa”, originated from the Latin word for “magpie” and came into medical usage as the peculiarities of the condition resembled, visually and behaviourally, the dominant characteristics of the magpie, namely, its colourful appearance and its indiscriminate selection of a wide range of edible and non-edible items (Parry-Jones & Parry-Jones, 1992). Some common types of pica include: eating earth, soil or clay (geophagia), ice (pagophagia) and

starch (amyliphagia). Persons with pica can also eat ashes/burnt matches, cigarette buts, soap, plaster, paint, cloth, hair, insects, animal droppings, sand, pebbles and dirt (Bhatia & Kaur, 2014). Among the variants, geoghagia (mudeating) and pagophagia (ice-eating) are predominant (Mensah, et a.., 2010). Since people may feel embarrassed to admit these unusual eating habits, and hide it from their physicians, the exact prevalence of pica is under-reported (Bhatia & Kaur, 2014). However, geophagia is frequently observed in pregnant women irrespective of culture (Singh, 2013).

A study carried out on low-income women born in Mexico and the United States reported a high rate of pica disorder most especially geophagia. After the interview of 225 participants, the study found 75% prevalence during pregnancy (Simpson, Mull, Longley & East, 2000). Similarly, Mortazavi and Mohammadi (2003) studied the prevalence of pica in 560 pregnant women who were referred to the health centres in Zahedan. The prevalence of pica among the women was 15.5%, in which 60.9% of them ate dirt, 25.3% ice, and others substances such as chalk, clay, freezer frost, tea stuff and other non-food substances.

In a service review survey of 56 consecutive pregnant women attending joint antenatal diabetes clinic, pica disorder was found in 23% of them. The commonest variant of pica in this group was pagoghagy (ice-eating) and amylophagy (uncooked starch). The survey reported that the pregnant women ingested sand, paper, gloss paint and sponge (Okunoye, Head & Issa, 2013).

2.1 Knowledge of geophagia among pregnat women.

Geophagy is a phenomenon with cultural and biological underpinning which is believed to give relief to the body under stress (Engberg, 1995). Research reviewed that geophagy is mostly practiced by African descendant (George & Ndip, 2011). Most pregnant women in Africa practice geoghagy because of the belief that particle sizes of the clay makes it suitable to form

coatings in the gastro-intestinal tract (Doel et al., 2012). Pregnant women in Africa believe that geophagy is good for fetal development most especially in Nigeria where the Igbo women seek for traditional doctors called Dibias to administer clay material to them during pregnancy (Izugbara & Emmanuel, 2003). For the clay materials to be considered safe for consumption it should be subjected to treatment such as phytoremediation before it is excavated. This is the use of living green plants for in-situ-risk reduction of contamination from earthy materials. For example, Thlaspi. caerulescens has been shown to absolve Zn, Pb and other heavy metals from soil (Brett et al., 1998). Poverty is one of the reasons why people practice geopghagy . More than 2 billion people are said to be poor and in Africa over 45% are under this category (WHO, 2003).

In a study conducted by Kalinda (2019), on exploring the psychological determinants of Geophagia among Women at Kabwata Clinic In Lusaka. Results, most participants said that they eat soil because they believe it protects the unborn baby, shortens labor and increases fertility. In addition, physiological factors also played a role in the practice of geophagia. The majority of the women in this study eat soil because they believe it gives them energy/nutrients, strengthens them and because they enjoy the taste of soil. Almost half of the participants (45.8%) have experienced some sought of health problem as a result of eating soil. These included diarrhoea, warms, stomach pains and constipation.

2.2 Attitudes of pregnant women with regards to geophagia

Myaruhucha (2009) determined the frequency and duration of pronounced dietary cravings, aversions and pica during pregnancy among 204 pregnant and lactating women, attending two health facilities in Dar es Salaam City, Tanzania. Findings from the study showed pica was experienced by 63.7% of the women and soil, ice and ash were the non-food substances mostly eaten. Craving in most women was found to be more intense in the first trimesters.

In another study in Kenya, 154 of 275 pregnant women (56%) surveyed in an antenatal clinic at Kilifi District Hospital, Coast Province reported eating soil regularly. Another 38 pregnant women, who reported eating soil regularly, participated in a focus group discussion where it was observed that the most commonly eaten soil was from the walls of houses. Twenty-seven of these women assisted in the collection of soil samples which were analyzed for their content of iron, zinc and aluminium. The study revealed that the average daily soil intake supplied the geohagous women (women who ate soil) with 4.3mg of iron, corresponding to 14% of the recommended dietary allowance of iron in pregnant women (Geissler et al, 1998).

One of the objectives of a study carried out in Pumwani Maternity Hospital, Nairobi, Kenya was to establish the prevalence of pica behaviour during pregnancy. In addition, the research wanted to identify the substances commonly ingested and their prevalence, and determine the characteristics of women who reported suffering pica. Findings showed that 74 of participants reported the disorder regularly on a daily basis. Most women who reported pica disorder also reported having experienced strong cravings prior to ingestion of pica items, i.e. childhood pica, pica before pregnancy, pica in previous pregnancy and a history of pica in family members and others in the community (Ngozi, 2008).

2.3 Geophagia disorder constututes health risks for both mother and child.

Another study carried out in Tanzania examined the associations of geophagy with anaemia and helminth infection among 971 Human Immunodeficiency Virus (HIV) positive pregnant women. The study revealed that 29% of the pregnant women regularly consumed soil and Ascarislumbricoides infection was associated with geophagy (Kawai, Saathoff, Antelman, Msamanga & Fawzi, 2009). The act of geophagy constitute to so many health problems faced by pregnant women and their unborn babies. For example, lead (Pb) exposure can cause intelligence

decline in children and cause cancer in adults (Wang et al., 2009). Zinc (Zn) is generally considered to be non-toxic, but can cause vomiting, dehydration, electrolyte imbalance, abdominal pain, nausea, dizziness diarrhea and growth retardation of the unborn baby (Scherz & Kirchhoff, 2006). The study reviewed that Copper (Cu) concentration is far above the (WHO, 2008) daily intake recommendation. Copper has been found to cause cancer and hypertension in the dark-skinned populations (Pfeiffer & Mailloux, 1987).

In a study conducted by Kalinda (2019), on exploring the psychological determinants of Geophagia among Women at Kabwata Clinic in Lusaka. The participants reported to practice geophagia for physiological and psychological beliefs. 45.8% of the participants admitted to have health problems from consuming soil, despite having health complication, all the women continued to practice geophagia.

In a study carried out to discover the prevalence of pica, its documentation on medical records, and its relationship to pregnancy outcomes in rural socioeconomically disadvantaged pregnant women, 38% of the participants were found to suffer from pica disorder. African-American women reported having the disorder more often than other ethnicities. The study reported that the substances ingested include ice, freezer frost, laundry starch, cornstarch, clay dirt, and baked clay dirt. Ingestion of more than one substance (polypica) was practised by 11 women (Corbett, Ryan, & Weinrich, 2003).

Luoba, Geissler, Estambale, Ouma, Magnussen, Alusala, Ayah, Mwaniki, and Friis, (2004) studied geophagy (soil-eating) among 827 pregnant women in Bondo District, western Kenya, during and after pregnancy. It was found that 65% of the women earth-eating before pregnancy, while 42.8% preferred earth from termite mounds. After a random sample of 204 stools which were collected from the women and analyzed as a tracer for earth-eating, it was discovered that geophagous women had higher mean silica content than the non-geophagous ones.

Results of a study carried out in Kumasi, Ghana to determine the prevalence of pica(geophagia), its various forms among pregnant women, the effects of education and place of residence on pica (geophagia) practice, showed that 47% of the pregnant women practised pica (geophagia). The study showed that age and level of education did not significantly affect the practice of pica (geophagia). Also, 17.4% of the respondents identified a family member practising pica (geophagia). The study therefore concluded that pica (geophagia) is highly prevalent in pregnant women in Kumasi (Mensah et al., 2010).

A study investigated the prevalence and possible risk factors for anaemia in 744 pregnant Sudanese women attending the antenatal clinic of New Halfa Teaching Hospital, eastern Sudan between October 2003 and April 2004. The findings of the study showed pica (geophagia) to be one of the risk factors for anaemia (Adam, Khamis & Mustafa, 2005). Sule & Madugu's (2001) study aimed at determining the prevalence of pica in pregnant women in Zaria, northern Nigeria. Structured questionnaire was administered by medical staff to all newly delivered mothers in the obstetrics unit of the Ahmadu Bello University Teaching Hospital (ABUTH) Zaria, for a two-week period. Fifty percent of the total number of respondents was found to have experienced pica. Findings also showed that there was a significant association between pica in family, friends or other members of the community and pica in index pregnancy. The study concluded that there is need to raise public awareness on the adverse effects of pica practice.

2.4 Measures pregnant women take against geophagia.

A study conducted purely as empirical research to understand the reasons for geophagia in modern day Ghana, prove there is no direct evidence that eating earth made the respondents stronger, it can be inferred that the reason for eating earth was the expectation that they would be stronger and more resilient to be able to face the challenges of pregnancy, such as reduced nausea,

spitting, and improve well-being. In terms of improving the resilience of the geophagists in relation to their health outcomes, there is evidence from the data set to suggest that this was achieved. Although the study did not measure the scale of resilience the respondents alleged garnered, it is reasonable to conclude that the sustainability of the practice was dependent on the benefits derived from its application. At worst, there was psychosocial benefit, even if there was no physical outcome and therefore no remedy is taken against that (Norman et al 2015). Similarly, a study conducted in Nigeria at Anambra state by Ekwenchi et al (2015), also postulated to the fact that their attitude to the disease is also negative given their negative disposition towards seeking medical attention upon suffering diaphagia disorder.

In a study conducted by Kalinda (2019), on exploring the psychological determinants of Geophagia among Women at Kabwata Clinic in Lusaka. The participants reported to practice geophagia for physiological and psychological beliefs. 45.8% of the participants admitted to have health problems from consuming soil, despite having health complication, all the women continued to practice geophagia.

2.5 Theoretical framework

The knowledge attitude and practice (KAP) model provided an apt theoretical framework for this research. As its name suggests, this model serves in analyzing knowledge and behavior of a given people in regard to any particular phenomenon. It explores changes in knowledge, attitude and practice in a community or group of people, vis-à-vis a given phenomenon such as pica disorder. The model posits that when the knowledge of a particular set of people is heightened on an issue, their attitude tends to change and which in turn results in the desired practices or behaviour. Hence, a heightened knowledge of the pica disorder and its consequences would likely lead to a positive change in attitude, and culminating in the desired behaviour. Stated differently,

KAP study tells us what people know about certain things, how they feel and also how they behave towards such things (Felix & Guntt, 2000). Thus, KAP measures knowledge, attitude and practice. The knowledge possessed by the community or people here refers to their understanding of a given topic, like the pica disorder. Attitude refers to their feeling towards the subject as well as preconceived ideas that they may have towards it; and practice refers to the ways in which they demonstrate their knowledge and attitude through their actions. In the context of this study, therefore, the intention is to interrogate the respondents' knowledge about pica disorder, their feelings towards that and the way the knowledge and feelings reflect in their reaction towards the disorder.

As stated by Felix and Guntt (2000), "understanding the levels of knowledge, attitude and practice will enable more efficient process of the creation of awareness creations; it will allow programmes to be tailored more appropriately to the needs of the people.

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CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter focused on the methodology that was used in the study. It dealt with research design, location of the study, target population, sampling techniques and sample size, research instruments, validity instruments, reliability of instruments, data collection procedures and ethical considerations which aided in the validity of the research

3.1 Research Setting

Berekum Municipal is one of the 261 Metropolitan, Municipal and District Assemblies (MMDAs) in Ghana, and forms part of the 12 of Municipalities and Districts in the Bono Region. Geographically, the Municipality can be located in the western part of Ghana in the Bono Region. It lies between latitude 7'15' south and 8.00' north and longitudes 2'25' east and 2'50' west with the capital as Berekum. The Municipality is close proximity to Cote d' Ivoire, is another remarkable feature which promotes economic and commercial activities between the District and Cote d' Ivoire. The Berekum Municipal shares boundaries with Wenchi Municipal and Jaman South Municipal to the north-east and north-west respectively, Dormaa Central Municipal to the south and Sunyani Municipal to the east.

The population of the Berekum Municipality according to 2021 *population* and housing census stands at 106,252 with 50,163 males 56,089 females. The youth and the children constitute more than half of the whole population and the population keep growing due to economic activities and fertility rate. There are three religious' kinds of worship at Berekum most of them are into Christianity, followed by Islamic act of worship and then lastly few peoples are

Traditionalists. They celebrate Kwafie festival between November and December. The majority of the households (61.8%) depends on borehole water for domestic activities. Open dumping is the mechanism for disposing solid wastes by the majority (65%) of the residents, while 43.4%, 34.9%, and 10.2%, respectively, disposed liquid waste unto the streets, compounds, and gutters. Most households (48.8%) depend on public toilet facilities which are inadequate and poorly maintained, and therefore waste management is an area of major concern to the municipality.

The community enjoys electricity from national grid, pipe borne water also exist in the town. They get their water supply from the Ghana Water and Sewage Co-operation (G.W.S.C). They enjoy the use of telephones and availability of network services from all networks and have good roads. The place is dominated by indigenous Bono (from the Akans) who represents majority of inhabitants; whiles minority tribes settle their due to marriage, occupation and other social activities. According to the 2021 population census the economic activities here are mainly farmers (45.8%) under estimation, others are petty trading such as barbering, driving, hairdressing, dressmaking, other craft work such as basket weaving and making clay pots, banking and other private enterprises, but the main occupation of the town is farming. They grow crops such as cassava, plantains, cocoyam, yam, tomatoes, pepper, garden eggs and cocoa and animal farming such as fowls, goat, sheep and cows. They have some social amenities like schools, KVIP and health facility (hospitals, clinics and CHPS).

The study was conducted in Berekum Municipal health facilities where activities of antenatal care are higher irrespective of the tribe, language and educational background.

According to estimated "Annual 2021 Reproductive and Child Health (RCH) Report," Berekum Municipality has an average of 40,803 pregnant women per year. There are 53 government and non-government antenatal clinics serving the area that have the ability to receive up to 50 pregnant women per day per clinic. The clinics provide reproductive and child health

services, including Prevention of Mother-to-Child Transmission of HIV (PMTCT), family planning, birth preparedness planning, as well as focused antenatal care that includes checking blood pressure and body weight, provision of intermittent presumptive treatment for malaria, deworming and nutrient supplements such as folic acid and iron.

3.2 Study Population

We were confronted with the difficulty of knowing beforehand the communities in Berekum that practice Geophagia. Thus, targeting only the commonly known ones was not enough in determining prevalence. Targeting women of reproductive age might also give a higher prevalence rate and limit the study just to them due to the practice's wide association with women of reproductive age. We decided to target pregnant women in order to estimate the prevalence for a specific category. Pregnant women within Berekum constituted our sampling frame. Those who were attending their last focused antenatal visit within the sampling frame were excluded from the study. Their inability to visit the antenatal clinic could have made tracing for clarification of responses and observation of their practices challenging.

3.3 Research Design

A research design, also called a research strategy, is a plan to answer a set of questions (McCombes, 2019). It is a framework that includes the methods and procedures to collect, analyze, and interpret data thereby, ensuring you will effectively address the research problem; it constitutes the blueprint for the collection, measurement, and analysis of data.

We conducted a cross-sectional study using structured questionnaires to document pregnant women's soil eating practices and to understand their knowledge, attitudes and beliefs about geophagy. The study focuses on pregnant women, about their knowledge, attitudes and practices

of geophagia in Berekum Municipality. The study was conducted in Berekum in the Bono region. The researcher chooses this setting because it was the place of interest of study, the researcher did not influence the variables being studied.

3.4 Sampling Size and Sampling Method

3.4.1 Sample Size Determination

The sample size was computed with the formula proposed by Yamane formulae (1967) as cited in (Glenn, 2009). The sample size for the study was 396 but there was an upwards adjustment of non-responses rate of 1%; that is 4; Thus, a sample size of 400 was estimated. To ensure accurate or good representation of the study, a large number of the population was taken which could be generalized.

3.4.2 Sampling method

Stratton (2021), defined Convenience sampling as non-probability sampling that is often used for clinical and qualitative research. Some subsets of the population were chosen for the study since it was impossible to use the whole population. A sample of 400 women attending antenatal clinic at Berekum hospitals and clinics were selected. A structured questionnaire was designed for data collection and a pilot study was conducted to test the questionnaire's validity and reliability. The sampling technique used was a convenience sampling method.

3.5. Data Collection methods and Instruments.

Structured questionnaires were used as means for data collection for the respondents using convenience sampling method. These instruments were developed by the researchers based on the essential requirements of pregnant women. Both open-ended and close-ended questions were

used. With some of questionnaires, answers were provided for the respondent to thick whiles the open-ended question enabled the respondents to express their views. The questionnaires were given to them and return them on their next antenatal visit of which two percent of the questionnaires never return from some of the respondents. The instrument consists of five sections A, B, C, D and E. A structured titled "assessing the knowledge, attitudes and practices of geophagy among pregnant women in Berekum" shall be used as main instrument for data collection. Section A contains the information on pregnant women demographical data which include; age, ethnicity and marital status and religion and Qualification in school, section B contains data on Knowledge of pregnant women with regards to geophagy practice, Section C on Attitude with regards to geophagy practice and Section D on awareness on pregnant women that geophagia disorder constitute a health risk for both the mother and the child and measures pregnant women put in place against geophagia practices.

3.6. Data analysis techniques

Data were entered into Microsoft Excel 2019 edition and imported to STATA version 17 for analysis. Data were analysed using descriptive and inferential statistics. Frequency distribution tables and histogram were used to descriptively analyse the data. Pearson chi-square and values were also used to test for associations between variables. The knowledge and attitude of pregnant women on geophagia was the independent variable, while the geophagia practices among pregnant women were dependent variable.

3.7 Validity and Reliability

Validity is the extent to which an instrument measures what it purports to measure. Validity is the trying to explain the truth of research findings as explained by Zohrabi, (2013). The

institution runs three-year nursing and midwifery programme, this study was focused to the first years making them the principal participants since they are the students who are currently offering Anatomy and Physiology. The second and third years are not inclusive because they possess different characteristics which cannot fit them to the study group.

According to Drost (2011), reliability is "the extent to which measurements are repeatable when different people perform the measurement on different occasion, under different condition, supposedly with alternative instruments which measure the construct or skill". It can also be defined as the degree to which the measure of a construct is consistent or dependable. The questionnaire was pilot tested with 20 pregnant women in one of the antenatal clinics in Nsoatre in a nearby district, and subsequently revised. Pregnant women who reported practicing geophagy representing 75%, during pregnancy were also asked to identify their sources of soil which clay was the predominant among the soil consumed by pregnant women. Some pregnant women were willing to show the researcher the exact location of the soil source so that a sample could be obtained. The pilot study also revealved that the (15) 75% pregnant women who practice geophagy do so to prevent and/or stop morning sickness and also to supplement their dietary intake. However, beliefs vary as those not practicing geophagy (5) 25% did not associate soil eating with a reduction in morning sickness. The majority of all participants practicing geophagy did not believe that eating soil ensures a healthy pregnancy or prevents prolonged labor and ensuring a healthy pregnancy. This enabled the researchers to fine-tune the questions and the checklist, making them clearer and more comprehensible to ensure reliability.

3.8 Ethical Considerations

Consent was sought from the management before the study. The respondents/ participants were assured of confidentiality and privacy throughout the study. Each respondent's consent was also

sought before the research was started though explanations were given to the respondents before they accepted to participate in the study. Also, respondents were made aware of their rights to withdraw from the study anytime as they wish to. They were assured that no harm physically, psychologically or emotionally would be inflicted on them. They were also made aware that no material benefit was going to be given to them for taking part in the study.

3.9 Limitations of the Study

There was limited time schedule for the research work to be carried out. Funding of the research was so limited and that it was not possible to use a large sample size. Some of the subjects were reluctant in spending time in answering the questions. Another limitation was searching for information on the internet. Also, collecting of the questionnaire after distribution was a problem on its own.

CHAPTER FOUR

DATA ANALYSIS

4.0 Introduction

This chapter entails the analysis and interpretation of the data obtained from the field and processing data into information which will be simple for use. The study employed the survey research method. This decision was informed purely by the nature of variables being investigated in the study. A sample of 400 women attending antenatal clinic at hospitals in the three major areas; Kato, Berekum and Jinijini was selected. A structured questionnaire was designed for data collection and a pilot study was conducted to test the questionnaire's validity and reliability. Results from the survey of a sample of 400 antenatal clinic attendees in government and non-government hospitals or clinics in Berekum municipality are as follows: Four hundred copies of the questionnaire were distributed; 379 (94%) were successfully recovered while 21 (6%) were not. Hence, 94% response rate was recorded. To assess the knowledge, attitudes and practices of geophagy among pregnant women in Berekum, the study questionnaire was categorized into four main sections. The analysis made here covers; the demographic data, which contains the information on pregnant women about their age, ethnicity and marital status and religion and qualification in school. The subsequent sections include; data on Knowledge of pregnant women with regards to geophagy practice, attitude with regards to geophagy practice and with the last section on the awareness on pregnant women that geophagia disorder constitute a health risk for both the mother and the child, and measures pregnant women put in place against geophagia practices.

SECTION A – BACKGROUND INFORMATION / DEMOGRAPHICAL DATA

Table 1.0 : Ages of respondents

Variables	Frequency	Percentage
18-24	50	13%
25-30	160	42%
31-39	98	26%
40- 45	71	19%
Total	379	100%

Source: field study

From the table above, 13% (n=50) fell within the age bracket of 18-24; 42% (n=160) fell within the age bracket of 25-30; 26% (n=98) fell within 31-39; and 19% (n=71) fell within the age bracket of 40-45.

Table 2.0: Ethnic Group of respondents.

Variables	Frequency	Percentage
Akan	209	55.1
Ewe	72	19.0
Hausa	36	9.5
Dagomba	25	6.6
Others (specify)	37	9.8

Source: field study

From the table above, 55.1% (n=209) fell within the Akan ethnic group, 19%(n=72) fell within the Ewe ethnic group, 9.5% (n=36) fell within the Hausa ethnic group; 6.6% (n=25) fell within

the Dagomba ethnic group and 9.8%(n=37) belongs to other ethnic groups. As the study was conducted in the southern part of Ghana which also dominates in the Akan ethnic group (population census, 2021).

Table 3.0: Marital Status:

Variables	Frequency	Percentage
Single	35	9.2
Married	252	66.5
Divorce	13	3.4
Others (specify)	79	20.9

Source: field study

From the table above, It was found that 9.2% of the respondents were singles, 66.5% were married couples, 3.4% of the respondents were divorcees and 2.6% of the respondents were in the others category. It was deduced that most of the respondents were married, which obey to the norms and culture of the Berekum community as pregnancy belongs to the married couples and nothing else. Therefore, it is a social shame to become pregnant without being married.

Table 4.0: Religion of respondents

Variables	Frequency	Percentage
Christian	300	79.2
Muslim	55	14.5
Traditional	14	3.7
Others (specify)	10	2.6

Source: field study

From the table above, It was found that 79.2.3% of the respondents were Christians, 14.5% were Muslims, 3.7% of the respondents were Traditionalists and 2.6% of the respondents were in the Others category (with others belonging to some other religion whiles others too do not belong to any religion).

Table 5.0: Qualification of respondents in school

Variables	Frequency	Percentage
a.School dropout/Never attended any school	11	2.9%
b.Junior High school Certificate	57	15.0%
c.Senior High School Certificate	129	34.0%
d. GCE/OND	61	16.0%
e. First degree/HND as their highest	99	26.1%
f. Postgraduate degrees.	22	6.0%

Source: field study

From the above table, 2.9% (n=11) of the participants had School drop out/Never attended any school, 15% (n=57) of the participants had Junior High school Certificate as their highest qualification; 34% (n=129) had Senior School Certificate/Equivalent, and 16% (n=61) had GCE/OND, 26.1% (n=99) had First degree/HND as their highest qualification and 6% (n=22) had postgraduate degrees. This table indicates that most of the respondents were SHS leavers.

SECTION B:

LEVEL OF KNOWLEDGE OF GEOPHAGIA DISORDER AMONG PREGNANT WOMEN

Table 6.0: Geophagia poses health benefits during pregnancy by respondents

Variables	Frequency	Percentage
Yes	200	52.8
No	179	47.2
Total	379	100.0

Source: field study

The participants were asked about how Geophagia poses health benefits during pregnancy. Fifty-three percent of the total number of respondents said Geophagia poses health benefits during pregnancy, while 47% said it does not. Thus, more than half of the respondents said, Geophagia poses health benefits during pregnancy, which suggests a fairly high prevalence of Geophagia among the women as shown in Figure 1 below.

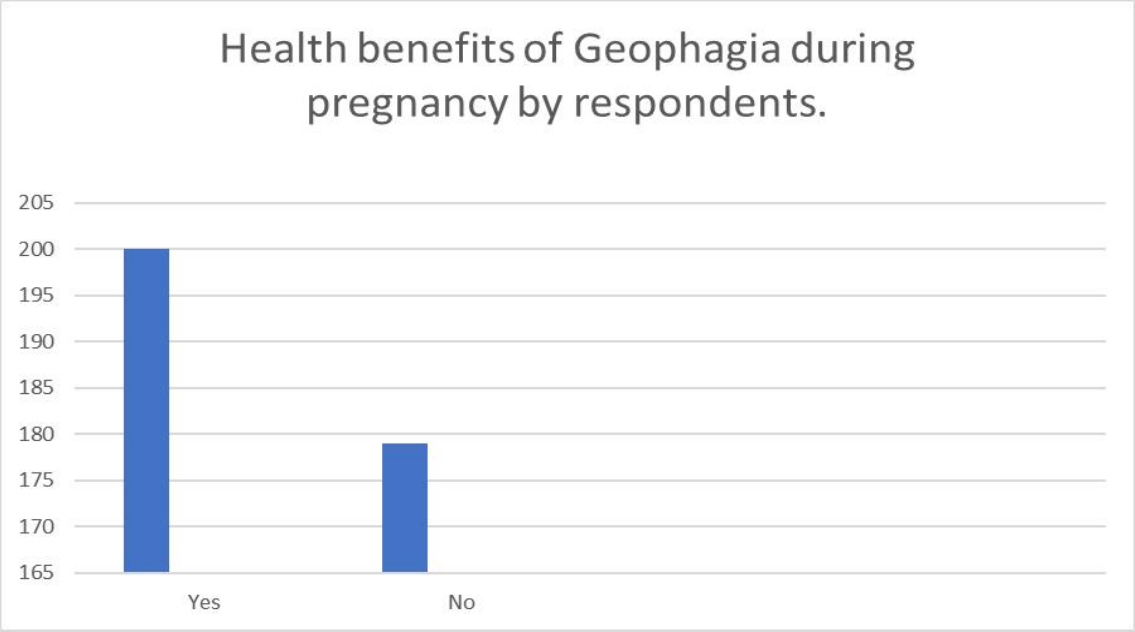

Figure1.0 : Geophagia poses health benefits during pregnancy by respondents

Table 7.0: Respondents' experience of Geophagia when pregnant

Variables	**Frequency**	**Percentage**
Yes	179	47.2
No	19	5
Don't know	181	47.8
Total	379	100.0

Source: field study

Table 2 shows that 47.2% (n=179) have experienced geophagia during pregnancy, while 5% (n=19) have not had this experience during pregnancy. A total of 47.8 (n = 181) gave no answers to this question, which is understandable given that about this number had earlier answered that, geophagia does not poses any health benefits. However, when this number (those who have never

experienced geophagia disorder) is eliminated, the percentage of the respondents who experienced geophagia disorders while pregnant comes to 90.4% as against those that experienced it outside pregnancy which now stand at 9.6%. This tends to confirm the belief that geophagia disorder is more common amongst pregnant women; in other words, they are more vulnerable to the disease than other persons as shown in Figure 2 below.

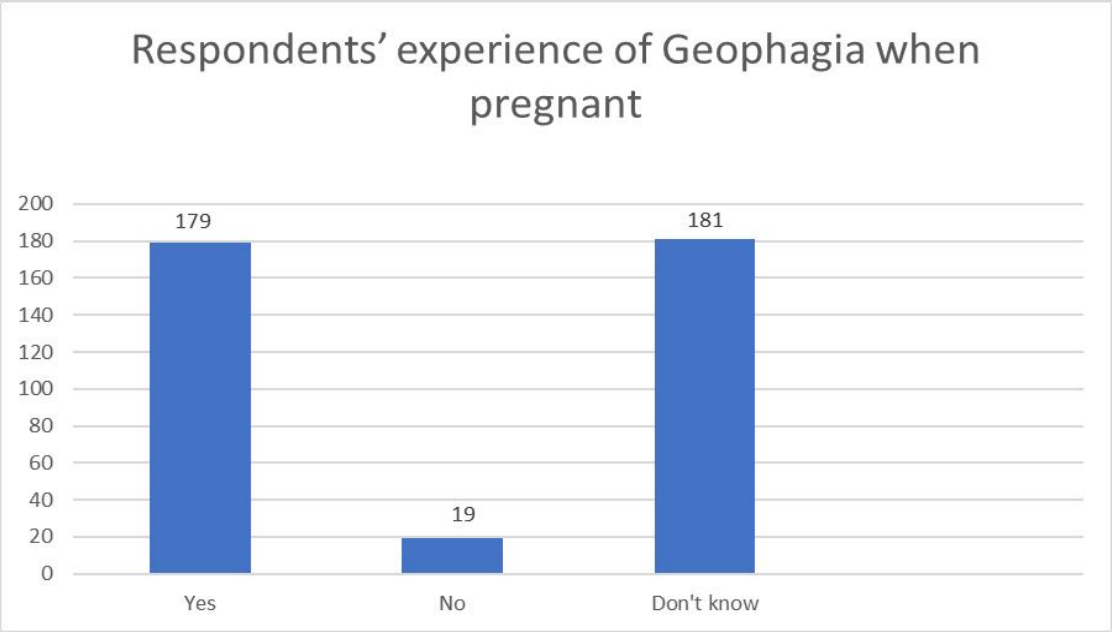

Figure 2.0: Respondents' experience of Geophagia when pregnant.

Table 8.0: Respondents' awareness that pregnant women are vulnerable to Geophagia Disorder

Variables	Frequency	Percentage
Yes	318	83.9
No	61	16.1
Total	379	100.0

Source: field study

Data in Table 3 show that 84% (n=318) of the respondents are aware that pregnant women are more vulnerable to geophagia than other persons as against 16% (n=61) who are not. This arguably indicates a high awareness of the association between pregnancy and geophagia disorder among the respondents as shown in Figure 3.0 below. Stated differently, the respondents appear to be aware that pregnancy exposes them to the risk of suffering the disorder.

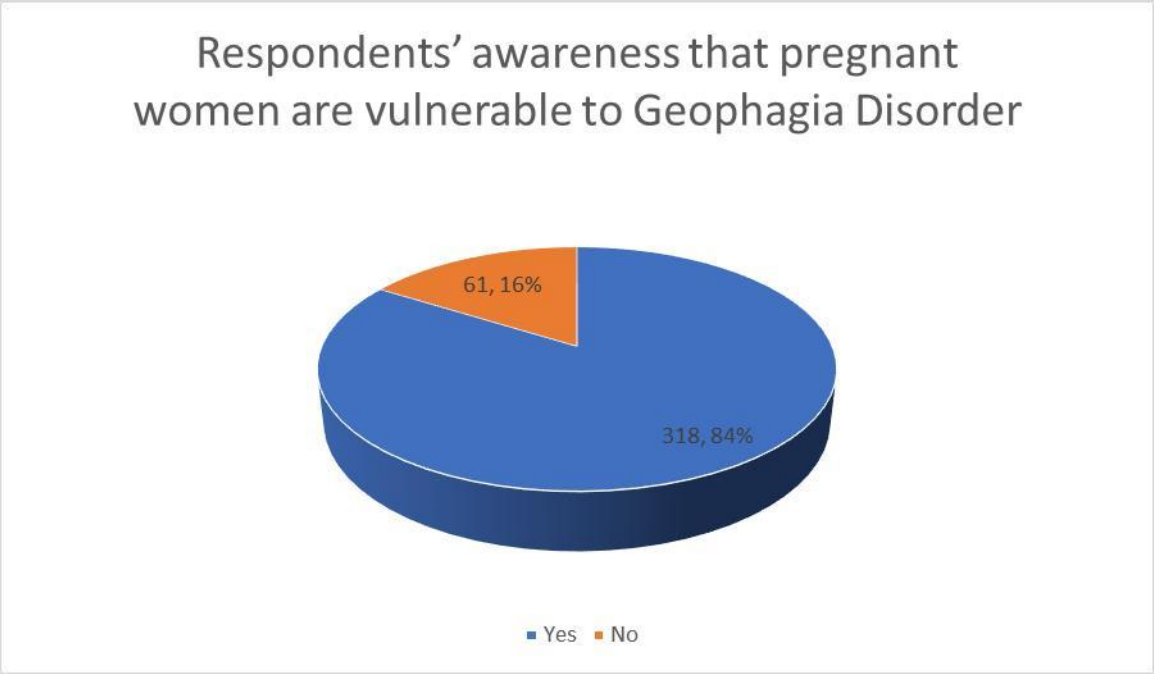

Figure 3.0: Respondents' awareness that pregnant women are vulnerable to Geophagia Disorder

Reasons why earthy-materials are taking in during pregnancy

Clay Ingestion in Pregnancy:

The reasons are crave (50.7%), smell (38.2%), cultural practices (33.1%), to stop nausea and vomiting (32.4%) and some also consume pica as a food substance as life giving (10.3%).

A Cultural Practice

Participants reported that during pregnancy, there were certain things women particularly from the African continent were supposed to eat. Clay was the first thing mentioned as noted below:

In terms of our culture, there are certain things that you are expected to eat and not to eat. You are expected to eat soil [clay]. This is because when you are pregnant and it rains the smell of rain and hormones make you feel like eating soil. . . (APN 1)

Clay eating during pregnancy was normal and known in her culture and she put it this way:

Everyone knows pregnant women eat clay in my culture. When they see, a woman eating clay, they will say, ahhh, you are now pregnant! Even though some people who are not pregnant eat it. When I was pregnant, I would send my husband to get me the clay. (AD 4)

As expressed above, clay ingestion in pregnancy was a phenomenon which participants situated in culture, and as such was readily accepted as well as expected by most people. Her husband, a key figure in decision making with regards to the pregnancy, was also an enabler in the practice. Though not just only confined to pregnant women, clay ingestion was often interpreted culturally, as a sign of pregnancy before this was potentially confirmed by doctors, midwives or off the counter- pregnancy testing kits. In addition, clay ingestion was viewed as cultural practice passed from one generation to another as one participant put it this way:

My aunts, mother and pregnant neighbors ate clay. You see for generations after generation, pregnant women have been eating clay. (KS 6)

Another participant noted that *eating "soil" during pregnancy was ubiquitous within the African continent, the heterogeneous nature of African cultures withstanding: It happens (clay ingestion) in Ghana or all over Africa. . . when you don't eat it you look pale. We buy it here. . . the clay, we buy it, they sell it openly. (KM 20)*

As noted by the KM 20 above, not eating clay in pregnancy had consequences that included "looking 'pale' which can be interpreted as 'looking unwell'."

However, in some instances clay was brought by family members to their pregnant relative as noted below:

My daughter, she goes to the market often so she brings it for me. Last time, she brought this clay; I didn't like it that much. It didn't have the normal taste that I like. So, I ate it a bit and threw it away because it didn't taste right. (SS 99)

Throwing away of the clay which "didn't taste right" suggests that not just any clay is ingested, i.e., it must have a certain acceptable taste.

SMELL

Participants reported that during pregnancy, there were certain things women particularly smell and always in a haste to have a feel of that particular thing. Words from some of the respondents is noted below:

Clay has a certain smell that, when you come across it whiles pregnant it is quite difficult for you to ignore without consuming some.(KV 105)

Odour stimuli play a major role in perception of food flavor. Clay also has a sweet-scented smell which however induces salivation of the one smelling it.

Clay odors are important in clay perception not only during consumption, but also in anticipation of clay, which always make me consume clay. (AE 115)

This woman made it clear that as soon as she starts smelling it, she also starts to anticipate consuming it right away.

We may think that clay flavours depend mostly on what we taste on our tongues, but our sense of smell has a far more dominant role to play than taste. (AA 116)

As the quote above suggests, smelling was one of the key reasons associated with clay ingestion.

CRAVING

Clay was however just not sold in Berekum but to satisfy the huge demand brought on by pregnant women who craved for it as noted below:

Clay is sold at most markets. You can get different types there; it's big, big business because most

pregnant women crave for it. Even those not pregnant, some just have craving. They bake it and package it nicely in plastics like sweets. (AA 116)

As the quote above suggests, desire to satisfy cravings was one of the key reasons associated with clay ingestion. The idea that clay was now a "big business" alludes to its commercialization in contrast with the excerpt below where the participant makes reference to individuals taking the clay from its original source, albeit equally driven by cravings:

When pregnant, you crave for certain things and I would say some of us eat clay because we crave for it. Because we crave for clay, it should not be seen as something to be shamed about. The main concern should be about the source of clay, because people buy and sell it. At times, you can go take it from a well-known source . . . we have ant hills, they have the best clay. And it is safe, our ancestors ate clay in their pregnancies without anything bad happening to them. (PJ 170)

According to PJ 170 woman above, "nothing bad" happened to their ancestors who also ate clay during pregnancy. Others made links between cravings and nutrient deficiencies as noted:

When you eat the clay after a craving, you will be satisfied but when you look at the books, it says that you feel like that because you have a deficiency in some nutrients, so the clay helps you there. (GD 200)

Alluding to clay ingestion as something not to be ashamed of indicates an awareness that this was viewed as a shameful practice, where everyone knew pregnant women ate clay as indicated in previous quotes. Furthermore, the participant went on to defend the practice as safe (without being prompted about safety issues) against a backdrop of this being a behavior practiced by their ancestors. As also noted above, some believed that the craving was brought on by a deficiency in nutrients which was complemented by what they believed was in the clay. This resonates with idea of "looking pale" when one does not ingest clay as previously indicated by one of the

participants. Another pointed out that the midwives were also partakers, hence didn't dissuade pregnant women from the practice:

Even the midwives don't tell you not to eat clay, because they are also women, and when pregnant, they also eat it like everyone else. They also get the craving. (OG 203)

While the midwives referred to above could be traditional ones as opposed hospital midwives, this nevertheless shows how widely acceptable the practice is. For another participant, the craving was so strong to the extent of waking up just to ingest as noted below:

It started as a habit, but also a craving, but as a pregnant woman, I ate more clay than before. Such that if the craving came upon me in the middle of the night in bed, I would wake up for a bite (laughs). It was always next to my bed side; the craving was really strong. (AP 215)

While the majority of women acknowledged eating clay or knowing someone who did as a remedy for cravings, a participant noted that it was often sourced from trusted communal places and which resonates with another participant who referred to anthills as follows:

When we were growing up, there was an ant hill nearby. An elderly woman lived close to it. Everyone called her grandmother as we do, most pregnant women used to go to that anthill to get clay. That anthill was well-known for its clay because it was tasty. Back then my mother would send me to get her some clay there, but before getting home, I would eat some because it was so good. No one would go there to do their toilet business; it was a special place. (YAG 259)

Another participant worried about the commercialization of clay because market sellers were not potentially concerned about their customers but making money:

There is need to take care now because things have changed. It is now more crucial for the clay to come from the right place. When things were not commercialized, and clay was free, you knew it was safe. But now with it has become commercialized, you just don't know. People are eager to make money; they don't care about what happens afterwards to pregnant women. (TF 270)

While clay was widely ingested, only one participant among the dozen who made references to clay in the study expressed concern about its safety without being prompted which raises questions about women's knowledge and awareness of the potential risks associated with the practice.

NAUSEA MANAGEMENT

In addition to satisfying cravings, clay was ingested to manage nausea among other things. Two participants put it this way:

There are many things pregnant women eat to rid of morning sickness, some ate lemons, some eat the skin of oranges but clay is an all-rounder. It can beat morning sickness; it can also be for the craving and for the minerals and vitamins that someone might lack.(YC 283)

Another one said:

You see pregnancy can be a difficult time, especially the first 3 months. Some people have no energy to do anything. Some people experience so much nausea and clay helps with that. But you should not eat too much because of constipation. You must drink plenty of water too. (DC 291)

As the first quote suggests, clay was perceived as "all-rounder" because it helped to manage morning sickness, the cravings and provided vitamins, better than lemons and orange skin. However, if eaten in large quantities there was an awareness of risking constipation.

LIFE GIVING

In addition to all above, clay was considered life giving, with religious connotations regarding the beginning of life perceived through creation, and returning to the soil in death. This participant put it this way:

Everything comes from soil; life comes from the soil. Are we not created from soil? And when we die, we go back to the soil, so there is nothing strange about eating it. Look at the way plants planted in rich clay soils do well and the ones planted in sandy soils don't do well. We too eat the

good rich clay, not just any soil. It gives life. (BA 295)

Because "everything comes from soil" ingesting clay was considered normal. As much as plants require good rich clays to sustain them, so did the women, particularly during pregnancy when sufficient nutrients are required to sustain the fetus. However, only the "right" kind of clay was perceived as giving life. Another participant perceived clay as lifesaving during sickness brought on by a traumatic pregnancy:

See, there was a time I was so sick. I was so sick . . . a difficult pregnancy. I went back to work just because I had to, and the only thing which kept me alive was clay. I did not have an appetite, nothing. I would eat the clay and drink some water and go to bed. It was the only thing I could eat till I was strong, till my appetite came back. . . it saved my life. (AK 309)

When one participant was asked if she had disclosed clay ingestion at the booking appointment, she responded:

No, you can't tell them (GP/ midwives) you are this person who is eating clay or washing in some leaves to keep the baby healthy (laughs). They will think you are crazy, so you don't talk about those things. (NJ 323)

The reluctance to talk about clay ingestion could be potentially related to the idea of a "shameful practice," with some concern about the practice attracting stigma among medical profession.

SECTION C:

ATTITUDES OF PREGNANT WOMEN IN REGARD TO GEOPHAGIA

Table 9.0: Frequency in day respondents consume earthy-materials in a week(own time)?

Variables	Frequency	Percentage
Once daily	52	29.0
Twice daily	63	35.2
Three times	25	14.0
Others	39	21.8
Total	179	100

Source: field study

Considering the times respondents consume earthy-materials in a week, 29% (n=52) consume earthy-materials once daily within a week, 35%(n=63) consume earthy-materials twice daily within a week, 14%(n=25) consume earthy-materials three times daily within a week, 22%(n=39) consume earthy-materials more than three times within a week. It was deduced that, most of the respondents consume earthy-materials twice daily leading to less of its complications being exhibited by the respondents as shown in Figure 4 below.

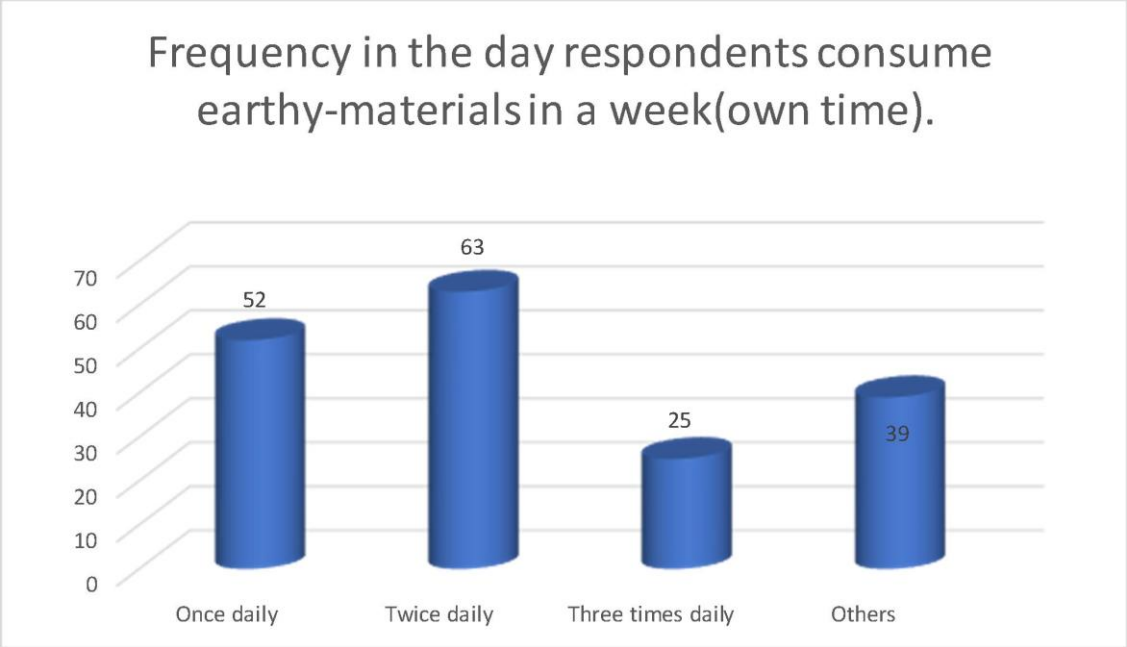

Figure 4.0: Frequency in day respondents consume earthy-materials in a week.

Table 10.0: According to trimester respondents crave and consume earthy-materials the most.

Variable	**Frequency**	**Percentage**
First trimester	98	54.7
Second trimester	53	29.6
Third trimester	21	11.7
Others (specify)	7	4.0
Total	179	100.0

Source: field study

Data in Table 4 show that 55% (n=98) of the respondents crave and consume earthy-materials in their first trimester, 30% (n=53) crave and consume earthy-materials in their second trimester, 12% (n=21) crave and consume earthy-materials in their third trimester and 4% (n=7) crave and

consume earthy-materials either throughout the three timesters or continues from the first to second trimester and end in the third trimester (Others). This suggests that majority of the respondents crave and consume earthy-materials in their first trimester as shown in Figure 5 below.

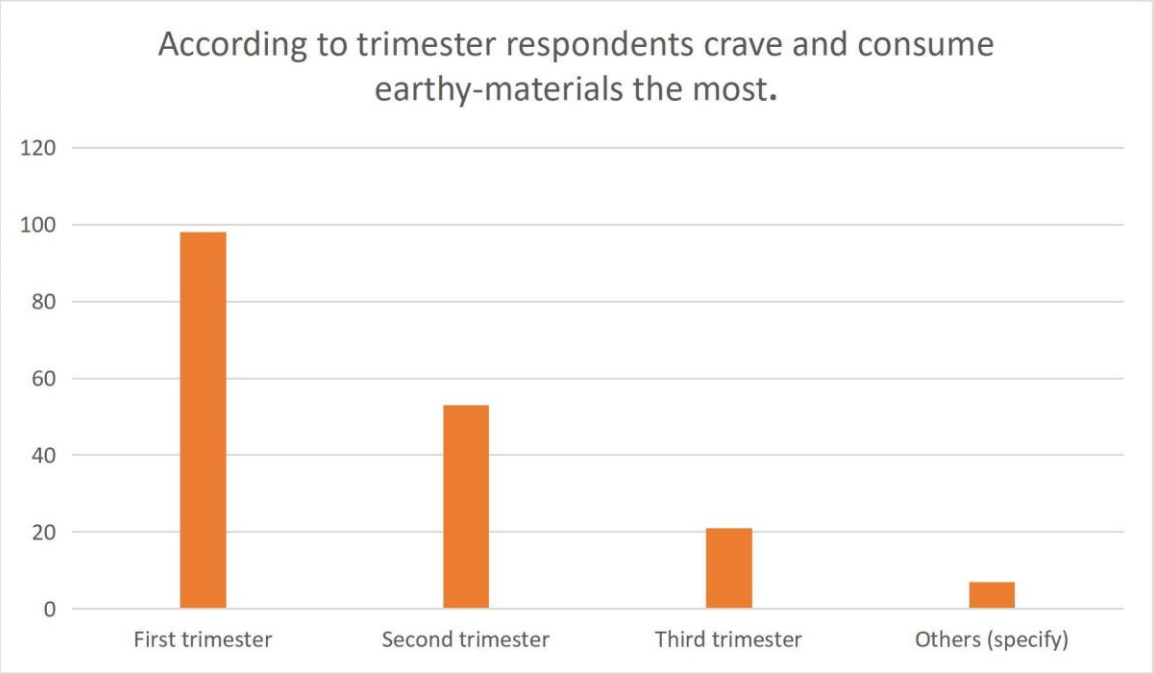

Figure5.0: According to trimester respondents crave and consume earthy-materials the most.

Table 11.0 : Time of the day respondents preferred for consuming earthy-material.

Variable	Frequency	Percentage
Early in the morning	78	43.6
Last thing before bedtime	63	35.2
During day time	37	20.7
Others (specify)	1	0.5
Total	179	100.0

Source: field study

From the table above,43.6% (n=78) respondents preferred consuming earthy-material early in the morning, 35.2%(n=63) respondents preferred consuming earthy-material as their last thing before bedtime, 20.7(n=37) respondents preferred consuming earthy-material during the day time whiles others too, have their specifics for consuming earthy-materials. This concur to the study conducted by Young et al. (2010) who stated in their studies that, Human beings indulge in geophagic practices for a variety of reasons of which relief from morning sickness was part. This confirmed to highest number of respondents consuming earthy-material early in the morning.

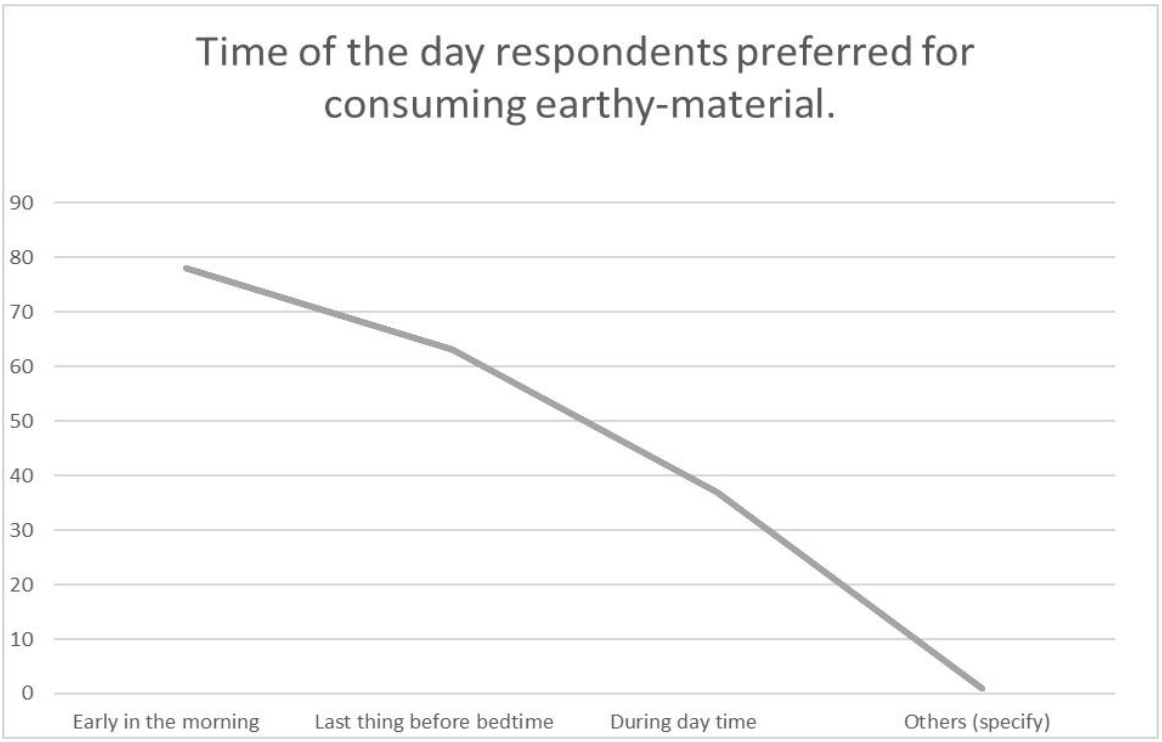

Figure 6.0: Time of the day respondents preferred for consuming earthy-material

SECTION D

RESPONDENTS' AWARENESS THAT GEOPHAGIA DISORDER IS DANGEROUS FOR THE MOTHER AND THE CHILD

Table 12.0: Respondents' awareness that Geophagia Disorder is dangerous for the mother

Variable	**Frequency**	**Percentage**
Yes	86	22.7
No	293	77.3
Total	379	100.0

Source: field study

Data in Table 4 show that 23% (n=86) of the respondents are aware that geophagia disorder is dangerous to the health of the pregnant mother, while 77% (293) are not aware of this. This suggests that majority of the respondents do not view geophagia disorder as constituting health risk to the mother as in Figure 6 below.

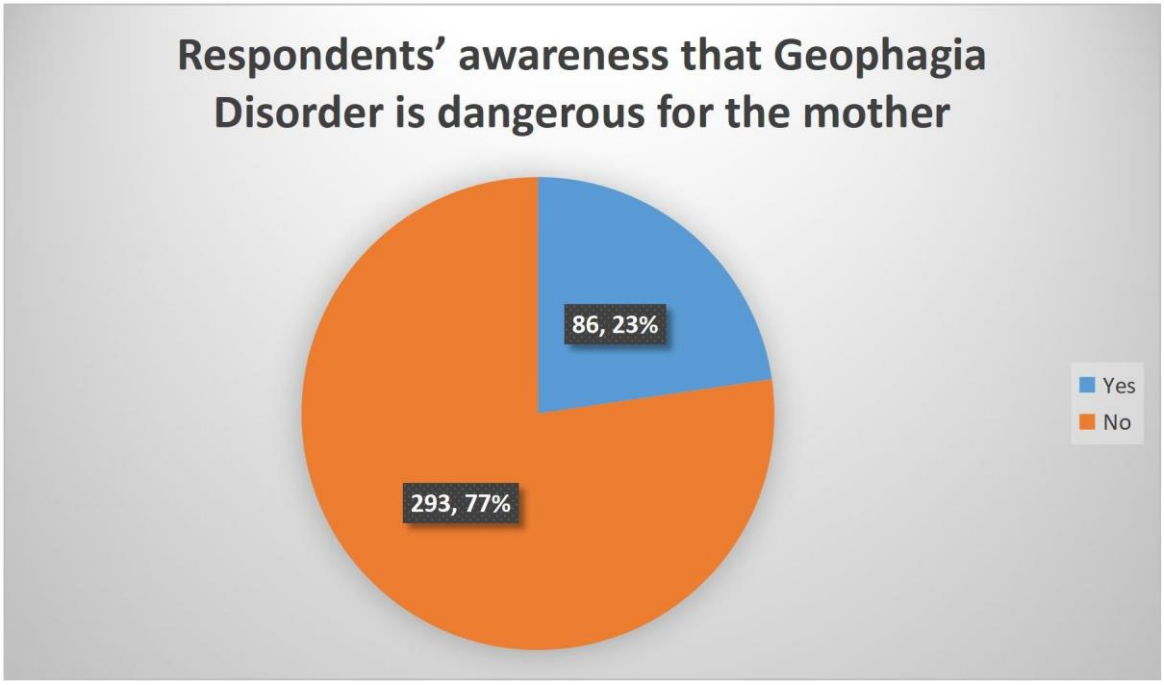

Figure 7.0: Respondents' awareness that Geophagia Disorder is dangerous for the mother

Table 13.0: Respondents' awareness that Geophagia Disorder is dangerous for the child.

Variables	**Frequency**	**Percentage**
Yes	109	28.8
No	262	69.1
No Answer	8	2.1
Total	379	100.0

Source: field study

Table 5 indicates that 28% (n=109) of the respondents are aware that geophagia disorder is dangerous for the child in the womb, while 69% (n=262) are not aware. It is probably surprising that there are more respondents that are aware that geophagia poses some health risk to the child in the womb than there are those who are aware that the disorder poses some risk to the mother. Nevertheless, the numbers who are aware of this danger of geophagia to the child is low.

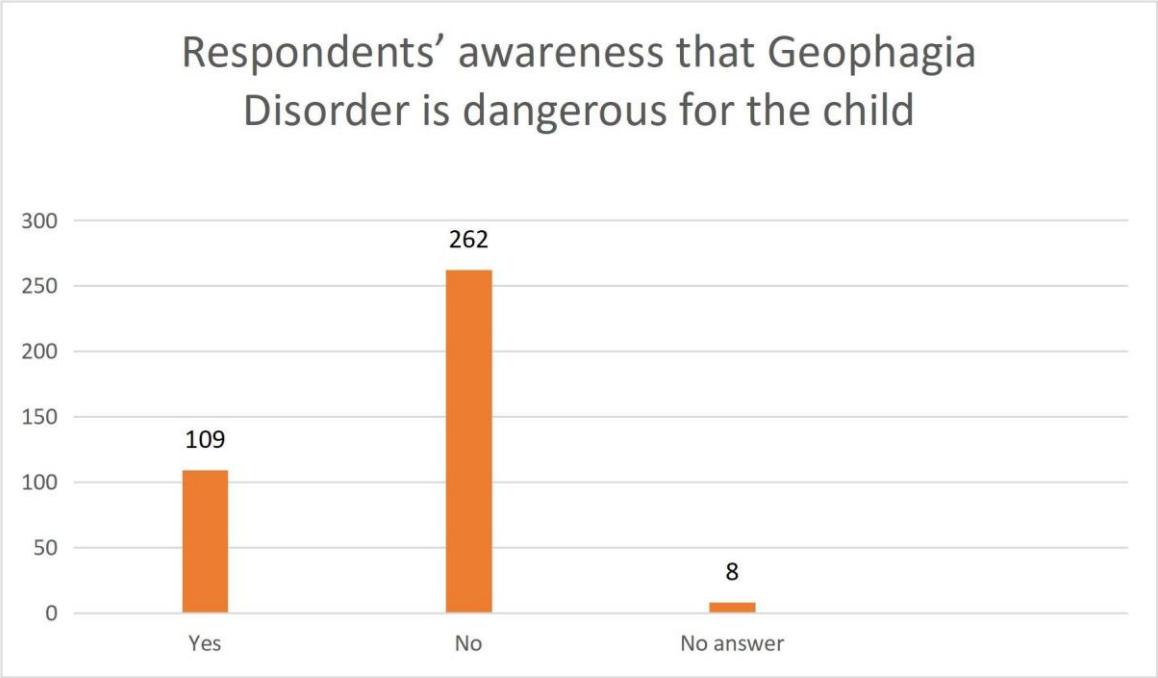

Figure 8.0: Respondents' awareness that Geophagia Disorder is dangerous for the child

SECTION E:

MEASURES RESPONDENTS' TAKE AGAINST GEOPHAGIA DISORDER WHEN THEY EXPERIENCED IT

Table 14.0: Respondents' seeking of medical advice while experiencing Geophagia Disorder

Variables	Frequency	Percentage
Every time I experienced it	9	2.4
Some of the times I experienced it	26	6.9
Few of the times I experienced it	26	6.9
None of the times I experienced it	139	36.7
No Answer	179	47.2
Total	379	100.0

Source: field study

Table 14.0 shows that 2.4% (n=9) of the respondents sought medical advice every time they experienced geophagia disorder; 6.9% (n=26) sought medical advice some of the times they experienced it; 26% (n=26) sought medical advice the few times they experienced it; while 36.7% sought advice none of the times they experienced it. However, 47.2% (179) gave no answer. It is remarkable that up to 36.7% failed to seek medical attention upon experiencing geophagia disorder. When the respondents that gave no answer are eliminated, those that have not sought medical attention come to 69.5%, which is the majority. This high percentage might have resulted from the fact that most of the respondents did not

appreciate the risk posed by geophagia disorder to the health of the mother and child as reflected in Tables 9 and 10.

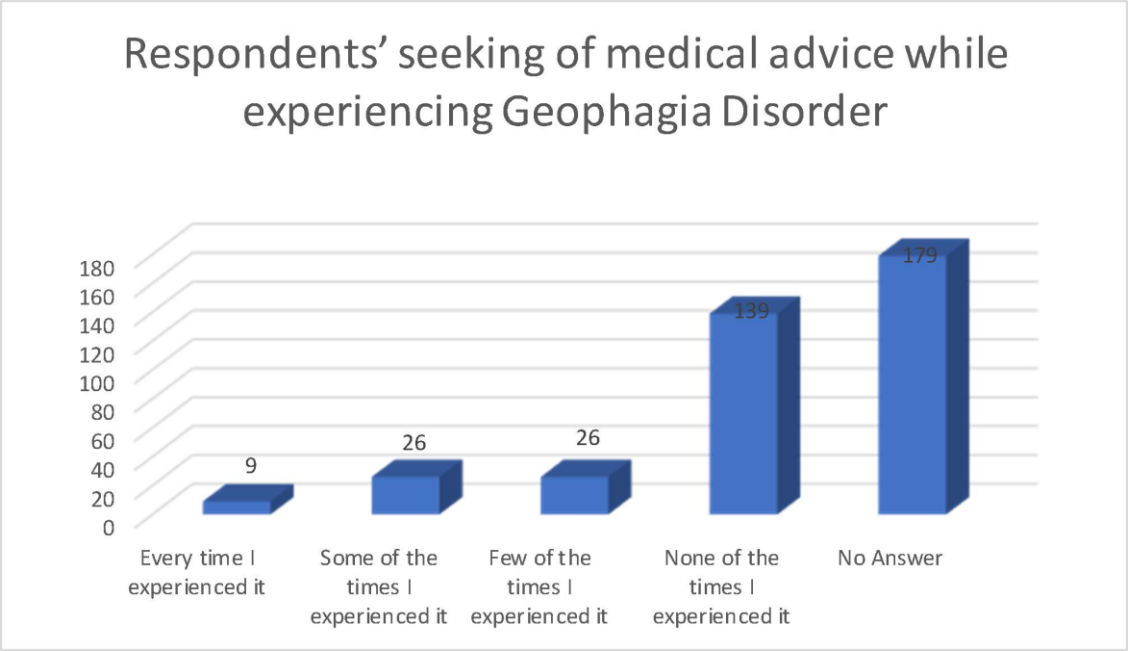

Figure 9.0: Respondents' seeking of medical advice while experiencing Geophagia Disorder

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS OF FINDINGS

5.0 Introduction

This chapter focuses on the general overview of the research as well as conclusions and recommendations for future research in this area. The main objective is to assess the knowledge, attitude and practice in regard to geophagia among pregnant women in Berekum Municipality in the Bono Region. The study revealed how generally pregnant women attending antenatal care indulge in geophagia practices. Four objectives regarding the knowledge, attitude and practice with respect to geophagia among pregnant women were set up for the study. The results of these findings are thoroughly explored and interpreted in this chapter.

According to Ages of respondents, 13% (n=50) fell within the age bracket of 18-24; 42% (n=160) fell within the age bracket of 25-30; 26% (n=98) fell within 31-39; and 19% (n=71) fell within the age bracket of 40-45. This study was inconsistent with the study conducted by Mashao, Ekosse, Odiyo & Bukalo (2021) which was carried out in Mashau Village, geophagia was found to be practiced by more than 75% of participants, especially among women of reproductive age (26–36 years).

According to ethnic group of respondents 55.1% (n=209) fell within the Akan ethnic group, 19%(n=72) fell within the Ewe ethnic group, 9.5% (n=36) fell within the Hausa ethnic group; 6.6% (n=25) fell within the Dagomba ethnic group and 9.8%(n=37) belongs to other ethnic groups. As the study was conducted in the southern part of Ghana which also dominates in the Akan ethnic group (population census, 2021). The practices of geophagia also comprises most of the Akan respondents, this attests to the place the study was conducted (Bono region of Ghana).

Because geophagia practices is prevalence in Africa irrespective of the respondent's country or tribe.

According to respondents' marital status, it was found that 9.2% of the respondents were singles, 66.5% were married couples, 3.4% of the respondents were divorcees and 2.6% of the respondents were in the others category. It was deduced that most of the respondents were married, which obey to the norms and culture of the Berekum community as pregnancy belongs to the married couples and nothing else. Therefore, it is a social shame to become pregnant without being married. There was no relationship between the practice of geophagia and participants marital status.

According to respondents' religious affiliation, it was found that, 79.2% of the respondents were Christians, 14.5% were Muslims, 3.7% of the respondents were Traditionalists and 2.6% of the respondents were in the others category (with others belonging to some other religion whiles others too do not belong to any religion). There was no relationship between the practice of geophagia and participants religion.

According to respondents' educational level, it was found that, 2.9% (n=11) of the participants had School dropout/Never attended any school, 15% (n=57) of the participants had Junior High school Certificate as their highest qualification; 34% (n=129) had Senior School Certificate/Equivalent, and 16% (n=61) had GCE/OND, 26.1% (n=99) had First degree/HND as their highest qualification and 6% (n=22) had postgraduate degrees. This table indicates that most of the respondents were SHS leavers. Geophagia has no educational divides, both the educated and the illiterate indulged in the practice. The study confirms the results of Momoh et al. (2015), which also discovered that geophagia was practiced by both the educated and illiterate. There was, however, a significant association of geopha bgic behaviour with educational level. This finding suggests that educational level might be a predictor of the practice of geophagia and that it is

more likely for someone at the lower educational stages to practice geophagia. Fawcett et al. (2016) also showed that in Africa, America and Eurasia, the practice of geophagia generally decreased with increased educational level.

5.1.1 Level of knowledge of geophagia disorder among pregnant women

On the health benefits Geophagia poses during pregnancy by respondents, Fifty-three percent (53) of the total number of respondents said Geophagia poses health benefits during pregnancy, while 47% said it does not. Thus, more than half of the respondents said, Geophagia poses health benefits during pregnancy, which suggests a fairly high prevalence of Geophagia among the women. This study was in tune with the study of Young and Miller (2019) elaborated on the benefits of geophagia, which included protection against pathogens and toxins, relief from gastrointestinal upset, nutrient supplementation, nutritional immunity. This study was in line with another study which exploited that, most pregnant women in Africa practice geoghagy because of the belief that particle sizes of the clay make it suitable to form coatings in the gastro-intestinal tract (Doel et al., 2012). This concord to the study conducted by Msibi (2014) that, It is believed that soil consumption is the link between good health. Macheka, Olowoyo, Matsela, and Khine (2016) reported on the prevalence of geophagia and its contributing factors among pregnant women. In that study, respondent believed that geophagia (eating clay or soil) has some health benefits. Some of the consumers indicated that they believed soil improved their health and that of the baby as it acted as an iron supplement and others also mentioned that it helps with heartburn and morning sickness during pregnancy. In a related study, most pregnant women (67.4%) indicated that soil does not provide nutrients to mother or unborn baby, while only a few (3.2%) indicated that soil provides nutrients to mother and unborn baby and 29.4% were not sure whether eating soil provides nutrients to mother and unborn baby (Nyanza, Joseph, Premji,

Thomas, & Mannion, 2014). The study was also in consistent with Young (2010). Geophagic materials are used to heal common illnesses of the gastrointestinal tract because they possess medicinal properties of bind to mucus in the intestines, causing intestinal linings to be impermeable to toxins and pathogens. Diko and Diko (2014) found the geophagic soils from Cameroon and South Africa are ingested for the relief of nausea and vomiting during pregnancy (morning sickness) which was also in line this study. A study done by Kalinda (2019) reported that, most participants said that they eat soil because they believe it protects the unborn baby, shortens labor and increases fertility which support this study.

On respondents' experience of Geophagia when pregnant, it was deduced that, 47.2% (n=179) have experienced geophagia during pregnancy, while 5% (n=19) have not had this experience during pregnancy. A total of 47.8 (n = 181) gave no answers to this question, which is understandable given that about this number had earlier answered that, geophagia does not poses any health benefits. However, when this number (those who have never experienced geophagia disorder) is eliminated, the percentage of the respondents who experienced geophagia disorders while pregnant comes to 90.4% as against those that experienced it outside pregnancy which now stand at 9.6%. This tends to confirm the belief that geophagia disorder is more common amongst pregnant women; in other words, they are more vulnerable to the disease than other persons. This study correlate with the study conducted at Dr. George Mukhari Academic Hospital, Pretoria on the "prevalence of geophagia and its contributing factors among pregnant women" by Macheka, Olowoyo, Matsela, and Khine (2016). Of the 597 participants interviewed, 323 indicated that they practiced geophagia, representing 54.0% of the study population. The study also support Lin et al., (2015) study on "Pica during pregnancy among Mexican-born women".Who concluded the yearning and conscious consumption of non-food stuff is common among many populations, especially during pregnancy, yet the health consequences are not well understood. This finding

also confirms the results from a study by George and Ndip (2011) in which 75% of the study participants had practiced geophagia. The study of Mensah *et al.*, (2010) concluded that pica (geophagia) is highly prevalent in pregnant women in Kumasi which also support this study.

With respect to respondents' awareness that pregnant women are vulnerable to Geophagia Disorder, it was found out that, 84% (n=318) of the respondents are aware that pregnant women are more vulnerable to geophagia than other persons as against 16% (n=61) who are not. This arguably indicates a high awareness of the association between pregnancy and geophagia disorder among the respondents as shown in Figure 7.0 above. Stated differently, the respondents appear to be aware that pregnancy exposes them to the risk of suffering the disorder. Findings from this study echo results from elsewhere which suggest that clay ingestion during pregnancy among black African women is widespread among African societies (Kutalek et al., 2010; Frazzoli et al., 2016; Gundacker et al., 2017). In this study and literature (Njiru et al., 2011; Nyanza et al., 2014), the association between pregnancy and clay ingestion was perceived as normal, with the latter often viewed as the first sign of pregnancy. It also accord with the survey reported by Okunoye, Head and Issa (2013) that the pregnant women ingested sand, paper, gloss paint and sponge.

On the reasons why earthy-materials are taking in during pregnancy, the reasons were the following: crave (50.7%), smell (38.2%), cultural practices (33.1%), to stop nausea and vomiting (32.4%) and some also consume pica as a food substance as life giving (10.3%). A study conducted in India on the prevalence of pica practice among pregnant women, identified that they consume pica because they enjoy the taste, it smells good, it is visually appealing, quench thirst and it helps in relieving nausea and vomiting (Garg & Sharma, 2010). Mensah et al. (2010) mentioned that apart from the cravings for the taste and/or smell of pica substances, other factors such as hunger, thirst, heat and gestational nausea could trigger the incidence of pica in

pregnancy. The cause of pica is not known, but it believed to be influenced by cultural, psychodynamic, socioeconomic factors and nutritional deficiencies (Kaur, 2014). Beyond this social dimension, participants in this study situated clay ingestion during pregnancy as a cultural practice passed down from past generations which concurs with findings by Frazzoli et al. (2016) which identify this as a cultural heritage among African societies in Zambia, Cameron, Tanzania, Nigeria, South Africa, and Kenya inter alia. Indeed, a number of research studies have identifified clay ingestion as deeply embedded in indigenous practices and or cultural practices or cultural variables (Geissler et al., 1999; Njiru et al., 2011; Diko and Diko, 2013; Henry and Cring, 2013; Reeuwijk et al., 2013; Frazzoli et al., 2016). This affirms the notion that culture provides a toolkit for a society's world view, with knowledge being passed down from generation to another which shape their behaviors (Swidler, 1986). Against this background, the role of culture in shaping Ghanaian women's reproductive health behaviors with regards to clay ingestion cannot be ignored. While the commodification of ingested clay "back home," where previously not the case, worried some participants, this contrasted sharply with the acceptance of its widespread commodification in countries such as Ghana and Nigeria which resonates with study findings from these countries inter alia (Nyanza et al., 2014; Frazzoli et al., 2016). In the context of migration, this study also concur to the studies of Abrahams et al., (2006); Reeuwijk et al., (2013) as these researchers observed clay imported from Africa being sold in African shops in London as recorded elsewhere in Europe. The continuous ingestion of clay by Black African women in this North London Borough through either purchasing or relying on those visiting "back home" to bring it, suggests of "actors selecting continuity from their cultural toolkit" (Chinouya and Okeefe, 2006, p. 96) as passed down from past generations in countries of origin. A review of qualitative studies by Benza and Liamputtong (2014) which explored the experiences of pregnancy amongst migrants in 11 Western European countries, similarly found that a complex

cultural framework of values and beliefs from countries of origin influence women's health behaviors in host countries. Against this background, Black African migrant women who view clay ingestion as an important aspect of pregnancy, may not listen to the top down warnings from Public Health England. The medicalisation of pregnancy treats women as "vessels," devoid of spiritual health that can benefit the mother and her baby. In this study, ingesting clay was described as an "all-rounder," i.e., connecting life and death through women's bodies. In tune with findings by Diko and Diko (2013) where clay ingestion was associated with rituals and beliefs and cosmology and symbolism, in this study, clay was considered life giving, with religious connotations made between the biblical beginning of life through creation as well as death, when bodies return to the earth. This reinforces the notion of a cultural practice embedded in indigenous knowledge which often does not separate rational knowledge from intuitions, spiritual knowledge and wisdom with blurred boundaries between the tangible and intangible things. Taking a holistic approach to women's health during pregnancy and the knowledge they bring during clinical encounters with midwives and GPs should facilitate nuanced discussions about their health and well-being during pregnancy. Faced with cravings, clay ingestion was perceived as a mineral supplement which catered for potential deficiencies, hence not ingesting clay was associated with "looking pale" which resonates with literature (Abrahams and Parsons, 1996). While pregnancy cravings were considered normal, with "white women" perceived to satisfy these through other means, there was awareness that clay ingestion among "us." i.e., black African women was perceived negatively. Similar studies have explored the relationship between the body, health and pregnancy, including the early work of Obeyesekere (1963) in Sri Lanka which showed that pregnancy cravings in the given context were culturally and socially determined. Furthermore, the idea that ingesting clay was nothing to be ashamed of as raised by a participant indicated an awareness of the stigma associated with the practice unlike "back home"

where in some communities, none ingestion during pregnancy was considered strange (Njiru et al., 2011). Thus, viewed through the lenses of the "other" culture which shapes black African women's health behaviors, ingestion was perceived a normal cultural expectation as well as a socially sanctioned habit which concurs with findings from other research studies (Njiru et al., 2011; Frazzoli et al., 2016; Hunter–Adams, 2016). In the context of antenatal care practice, there was evidence that women were unlikely to disclose clay ingestion, along with the use of other traditional products such as "leaves from back home" to health care professionals because they worried being perceived "crazy" as noted by one of the respondents. This supports the assertion by Njiru et al. (2011) that the perception of clay ingestion as a shameful behavior leads to under reporting in health care settings by pregnant women. While in this instance, clay is perceived a food product, the hegemonic link between the notion of "dirt" which is a social construction, i.e., dirt being garbage out of place and soil (Douglas, 1966) compounds stigma issues. Hence, the lack of disclosure in antenatal care practice suggests that expectant women will continue to ingest clay in silence. Thus, positioning clay as a danger to women and their unborn babies and as a subject that is to be addressed with a top-down approach can only strengthen the silence and its position as a taboo subject. This creates challenges for midwives in particular as targeting pregnant African women to discuss the risks posed by clay ingestion could be construed as racist. How can knowledge from this study and elsewhere which indicate that clay is ingested as a remedy for morning sickness and nausea among other life sustaining beliefs (Njiru et al., 2011; Frazzoli et al., 2016) be integrated with the evidence from biomedical science which indicates that some clays pose danger? We contend there is need for nuanced understanding, particularly on the part of Public Health practitioners, that alerting women to the dangers of ingesting clay without understanding its cultural and social roots, potentially acts as a stumbling block to the delivery of effective and culturally sensitive public health interventions. Furthermore,

this hinders the exploration of innovative pathways to integrating biomedical knowledge and indigenous knowledge regarding the practice. More than 40 years, ago; Bradford Council in England produced “an eye- catching leaflet stating that sikor (clay) may be consumed as mineral nutrient supplement” (Middleton (1989) cited in Abrahams et al., 2006, p. 99). Could such an approach work against a backdrop of scientific tests and checks on clay products to demonstrate safety for human consumption? Despite the repeated warnings by the FSA and PHE to pregnant women to stop ingesting clay, evidence from this study and elsewhere (Diebelius, 2018) show that women continue to purchase and ingest clay.

5.1.2 Attitudes of pregnant women in regard to geophagia

On the frequency in day respondents consume earthy-materials in a week (own time); considering the times respondents consume earthy-materials in a week, 29% (n=52) consume earthy-materials once daily within a week, 35%(n=63) consume earthy-materials twice daily within a week, 14%(n=25) consume earthy-materials three times daily within a week, 22%(n=39) consume earthy-materials more than three times within a week. It was deduced that, most of the respondents consume earthy-materials twice daily leading to less of its complications being exhibited by the respondents. This study affirms to the study conducted by Mashao, Ekosse, Odiyo, Bukalo, (2021) who conducted their study at Mashau Village, Limpopo Province, South Africa on Geophagic practice. Of 181 respondents, they conducted their study on 34.8% stated that they consumed soil more than once a day, 36.7% indicated that they consumed at least once per day, 21.0% once a week and 17.7% once a month.

According to trimester respondents crave and consume earthy-materials the most. This study shows that most pregnant women crave and consume earthy-materials in their first trimester 55% (n=98), 30% (n=53) of the respondents crave and consume earthy-materials in their second

trimester, and 4% (n=7) crave and consume earthy-materials either throughout the three trimesters or continues from the first to second trimester and end in the third trimester(Others).The consumption of pica in the first trimester could be attributed to the physiological changes that occur, especially during the first trimester pregnancy due to the influence of the human chorionic gonadotrophin hormone. During this period, women develop cravings for many non-food items simply because they have nice smell and appealing to eat. Nyanza et al. (2014) showed that geophagy was initiated at various times during pregnancy: in the first trimester (54.8%), in the second trimester (36.1%) and in the third trimester (9%). It is assumed that within the first trimester pregnancy symptoms are most severe (Aslan et al., 2014). This also affirmed to the study of Norman, Binka and Godi (2015) who concluded that, 92% of their respondents stated that their desire to eat dirt is stronger when pregnant.

On the time of the day respondents preferred for consuming earthy-material. This study shows that, 43.6% (n=78) respondents preferred consuming earthy-material early in the morning, 35.2%(n=63) respondents preferred consuming earthy-material as their last thing before bedtime, 20.7(n=37) respondents preferred consuming earthy-material during the day time whiles others too, have their specifics for consuming earthy-materials. This concur to the study conducted by Young et al. (2010) who stated in their studies that, Human beings indulge in geophagic practices for a variety of reasons of which relief from morning sickness was part. This confirmed to highest number of respondents consuming earthy-material early in the morning.

5.1.3 Respondents' awareness that Geophagia Disorder is dangerous for the mother and the child

On respondents' awareness that Geophagia Disorder is dangerous for the mother it was deduced that, 23% (n=86) of the respondents are aware that geophagia disorder is dangerous to the health of the pregnant mother, while 77% (293) are not aware of this. This suggests that majority of the respondents do not view geophagia disorder as constituting health risk to the mother. Msoffe et al. (2019) indicated that pregnant women in Tanzania and their babies are potentially exposed to toxic levels of As, Al, Ba, Cd, Ni, and Pb. The practice of geophagia during pregnancy is also associated high serum level of the heavy metals, as shown in a study conducted in Nigeria among geophagic pregnant women (Akah et al., 2020). Zeigbo et al. (2020) also showed that geophagia may predispose pregnant women to gestational diabetes, electrolytes imbalance and reduced intestinal enzymes activities. The self-reported medical conditions (constant headaches and dizziness) and those that participants were diagnosed with (iron deficiency and low Hb levels participants) could be an indication of more complicated health issues such as anaemia. There is also a concern that geophagists are at risk of ingesting soil-borne infectious parasites such as hookworm, roundworm and whip-worm. These parasites are associated with malnutrition and fetal nervous damage in children (Okereke et al., 2015).

On respondents' awareness that Geophagia Disorder is dangerous for the child it was deduced that, 28% (n=109) of the respondents are aware that geophagia disorder is dangerous for the child in the womb, while 69% (n=262) are not aware. It is probably surprising that there are more respondents that are aware that geophagia poses some health risk to the child in the womb than there are those who are aware that the disorder poses some risk to the mother. Nevertheless, the numbers who are aware of this danger of geophagia to the child is low. Carmichael et al. (2003)

and Akah et al. (2020) also stated that the practice of geophagia during pregnancy could be a risk factor for lead toxicity in infants. Gundacker et al. (2017) reported that soils ingested by pregnant women in some parts Democratic Republic of Congo contained substantial amount of lead, which could lead to prenatal lead exposure.

5.1.4 Measures respondents' take against geophagia disorder when they experienced it

Finally, concerning respondents' seeking of medical advice while experiencing Geophagia Disorder, it was deduced that, 2.4% (n=9) of the respondents sought medical advice every time they experienced geophagia disorder; 6.9% (n=26) sought medical advice some of the times they experienced it; 26% (n=26) sought medical advice the few times they experienced it; while 36.7% sought advice none of the times they experienced it. However, 47.2% (179) gave no answer. It is remarkable that up to 36.7% failed to seek medical attention upon experiencing geophagia disorder. When the respondents that gave no answer are eliminated, those that have not sought medical attention come to 69.5%, which is the majority. This study viewed through the lenses of the "other" culture which shapes women's health behaviors, ingestion was perceived a normal cultural expectation as well as a socially sanctioned habit which therefore do not warrant them to seek for medical advice which concurs with findings from other research studies (Njiru et al., 2011; Frazzoli et al., 2016; Hunter–Adams, 2016).

5.2 Conclusion

Given the rise of clay commodification and the continuation of this practice despite repeated warnings, is it not time to consider appropriate regulation, with safe clay products, if any, certified for fitness for human consumption? From an anthropological perspective, there is recognition of health benefits associated with clay ingestion under certain circumstances

(Abrahams and Parsons, 1996; Henry and Cring, 2013; Tayie et al., 2013). However, because the chemical composition of clay differs greatly depending on the source, this makes it difficult to assess either potential dangers or benefits to health posed by all clay. As already highlighted elsewhere, there are changes in living environments which pose risk factors to ingesting clay e.g., waste disposal, mining activities and biomedical science has been most effective in pointing these out. Given these changes, a call for this cultural practice to be revisited is in order. In the words of Frazzoli et al. (2016, p. 1465) "therefore benefits to risks ratio of cultural behaviors-initiated centuries ago based on traditional medical practices require deep revision and assessment." This raises the question: How can this be done without continuing to marginalize the "other" cultural practices and beliefs, "often figured as inferior forms of knowing to be replaced by universalized knowledge derived from the Western scientific tradition" (Bag and Pramanik, 2012, p. 8)? As a starting point, we note that most research studies focus on clay toxicity and potential health risks, hence the practice is viewed as shameful and savage; a psychological disorder which must be banished. While understanding clay toxicity is pivotal, the potential health benefits associated with clay ingestion in specific circumstances remain under researched.

This skewed knowledge base has resulted in neglect by policy makers, hence the lack of appropriate regulation and blanket Public Health campaigns to dissuade pregnant women from the practice. We argue that there is need for future research studies to consider health claims associated with none toxic clay with the aim of identifying clay fit for human consumption, if any. This can potentially inform appropriate policy directions which is particularly important because despite the repeated health warnings, clay ingestion is a cultural practice that has survived for centuries, hence the likelihood of persisting for generations to come.

Lastly, clay ingestion amongst black African women should not be divorced from the other structural issues that exacerbate health inequalities, particularly given that the UK Public Health

Outcome Framework takes the life course approach to maternal health improvement. An approach that Public Health England may wish to consider is to work very closely with community women's groups, networks, churches and other agencies. For example, African women are over represented in HIV prevalence and it has been shown in interventions that African communities can be engaged in public health initiatives if they feel that they "own" the problem and are given the platform to design interventions that sit well within their diverse cultures (Chinouya, 2004). In the absence of regulation and clay clearly certified as safe for human consumption, community-led initiatives which raise awareness about the potential dangers of clay ingestion in pregnancy are required because the current top-down approach risks further pushing the practice underground. Some studies done by previous researchers such as Macheka et al., (2016), Meel, (2012) Mensah et al.. (2010) and Nkansah et al., (1989) have pointed to varied health problems associated with its consumption.

We call upon Public health authorities to work closely with community groups so they design bottom up, culturally competent interventions.

5.3 Recommendations

1. The results revealed that most of the women vising the ante natal clinic were soil consumers; it may be beneficial to educate the women in their early stages of pregnancy on the dangers of soil consumption.
2. Follow up cohort studies can be done on the consumers to check whether they were only ingesting soil during pregnancy or have continued after giving birth. This can assist health professionals in ascertaining whether geophagia is linked only to pregnancy or needs to bead-dressed even during breastfeeding or early motherhood.

3. Healthcare professionals, especially midwives must intensify health education on the effects of pica among pregnant women especially in all trimesters of pregnancy.

4. Alternate means of preventing nausea and vomiting should be included as part of antenatal care education in first trimester pregnancy. These alternatives may include the eating of dry bread, biscuits or sweets to reduce the effects of nausea and vomiting during pregnancy.

5. Health workers should intensify health education on pica(geophagia) and its negative impacts on the health of the mother and the foetus.

REFERENCES

Akah P.A., Zeigbo T.O., Oforkansi M.N., Onyeto C.A. Effect of kaolin consumption on serum heavy metal levels of pregnant women. *International Journal of Sciences.* 2020; 9:28–32.

American Psychiatric Association (1994). Diagnostic and statistical manual of mental disorders: DSM-IVC (4th edition). Washington DC: American Psychiatric Press.

Aslan, P. , Aydın, N. , Yazıcı, E. , Aksoy, A. N. , Kirkan, T. S. , & Daloglu, G. A. (2014). Prevalence of depressive disorders and related factors in women in the first trimester of their pregnancies in Erzurum, Turkey. *International Journal of Social Psychiatry, 60(8), 809–817. 10.1177/0020764014524738*

Badr, E. (2009). Public health communication: Some Lessons for effectiveness. *Sudanese Journal of Public Health* 4 (3): 313 – 321.

Bhatia, M.S., & Kaur, J. (2014). Pica as a cultural bound syndrome. *Delhi Psychiatry Journa*l 17(1): 144 – 147.

Bhatia, M.S, & Singhal, P.K. (2012). *Problems of behaviour in children and adolescents.* A practical guide for health upbringing. Delhi: CBS Publishers and Distributors Ltd.

Blinder, B. J., Goodman, S. I., & Henderson, P. (1988). Pica: *A critical review of diagnosis and treatment*. PMA Publishing Corp.

Centre for Disease Control and Prevention (2015). *Health communication basics.* Retrieved from http://www.cdc.gov

Corbett, R.W., Ryan, C., & Weinrich, S.P. (2003). Pica in pregnancy: Does it affect pregnancy outcomes? *The American Journal of Maternal/ Child Nursing* 28(3): 183-189

Doel, E.D.,Awua ,A.,Achoribo,S.E.A., Adu-Bobi, N.A.K., Donko,S., BaidooI.,Opata N.S,Ampong,A.G (2012). *Essential and toxic element present in clay obtained from Ghanaian*

Market Elixir Appl. Biology 47 8633- 8636, retrieved from http://www.elixirpublishers.com/articles/1350380039_47%20(2012)%208633-8636.pdf

Diko M.L., Diko C.N. *Physico-chemistry of geophagic soils ingested to relief nausea and vomiting during pregnancy*. Afr. J. Tradit., Complementary Altern. Med. 2014;11(3):21–24.

Diebelius G. (2018). *Mum Loves Eating Clay so Much She Quit Her Job to Sell It.* Metro. Available online at: https://metro.co.uk/2018/05/09/ mum-loves-eating-clay-much-quit-job-sel l -7531890/(accessed 2 May, 2019).

Engberg,D. (1995) GEOPHAGY: ADAPTIVE OR ABERRANT BEHAVIOR: University of Nebraska – Lincoln Digital Commons, University of Nebraska- Lincoln VOL. 12, NO.1 retrieved from: from http://digitalcommons.unl.edu/cgi/ viewcontent.cgi?article=1083&context=nebanthro

Fawcett E.J., Fawcett J.M., Mazmanian D. A meta-analysis of the worldwide prevalence of pica during pregnancy and the postpartum period. *Int. J. Gynaecol. Obstet.:* The Official Organ of the International Federation of Gynaecology and Obstetrics. 2016;133:277–283.

Felix, K. & Guntt. L. (2000). *Understanding health communication.* New York: Prudence

Frazzoli C., Pouokam G. B., Mantovani A., Orisakwe O. E. (2016). Health risks from lost awareness of cultural behaviours rooted in traditional medicine: an insight in geophagy and mineral intake. Sci. Total Environ. 566–567, 1465–1471. 10.1016/j.scitotenv.2016.06.028

Geissler, P. W., Shulman, C. E., Prince, R.J., Mutemi,W., Mnazi, C., Friis, H.,& Lowe, B. (1998). *Geophagy, iron status and anaemia among pregnant women on the coast of Kenya.* Transactions of the royal social of tropical medicine and hygiene 92(5): 549-553.

George , G and Ndip, E (2011). Prevalence of Geophagia and its possible implications to health A study in rural South Africa: *2nd International Conference on Environmental Science and Development* IPCBEE vol.4 retrieved from

http://www.ipcbee.com/vol4/37-ICESD2011D10046.pdf

Gundacker C., Kutalek R., Glaunach R., Deweis C., Hengstschläger M., Prinz A. Geophagy during pregnancy: is there a health risk for infants? Environ. Res. 2017;156:145–147.

Kalinda Z., (2019). *Exploring the psychological determinants of Geophagia among Women At Kabwata Clinic In Lusaka*. Publisher; University of Zambia

Kawai, K., Saathoff, E., Antelman, G., Msamanga, G., & Fawzi, W.W. (2009). Geophagy (soil-eating) in relation to anemia and helminth infection among hiv-infected pregnant women in Tanzania. *The American Journal of Tropical Medicine and Hygiene* 80 (1): 36-43.

Louba, A. I., Geissler, P. W., Estambale, B., Ouma, J. H., Magnussen, P., Alusala, D., Ayah, R., Mwaniki, D., & Friis, H. (2004). Geophagy among pregnant and lactating women in Bondo District, western Kenya. *Transactions of The Royal Social of Tropical Medicine and Hygiene* 98 (12): 734-741.

Macheka, L. R. , Olowoyo, J. O. , Matsela, L. , & Khine, A. A. (2016). *Prevalence of geophagia and its contributing factors among pregnant women at. Dr. George Mukhari Academic Hospital, Pretoria. African Health Sciences*, 16(4), 972–978. 10.4314/ahs.v16i4.13

Mashao U, Ekosse GI, Odiyo J, & Bukalo N.(2021). *Geophagic practice in Mashau Village, Limpopo Province, South Africa. Heliyon*. 2021 Mar 17;7(3):e06497. doi: 10.1016/j.heliyon.2021.e06497. PMID: 33817373; PMCID: PMC8010397.

Myaruhucha, C. N. (2009) Food cravings, aversions and pica among pregnant women in Dar es Salaam, Tanzania. *Tanzania Journal of Health Research.* Vol 11, No 1.

Mensah, F. O., Twumasi, P., Amenawonyo, X. K., Larbie, C., & Baffo. A. K. (2010). Picapractice among pregnant women in the Kumasi metropolis of Ghana. *International Health* 2(4): 282-286.

Msibi A.T. (2014). *The Prevalence and Practice of Peophagia in Mkhanyakude District of Kwazulu-Natal.* University of KwaZulu-Natal; South Africa. Published MSc dissertation.

Msoffe C.U., Nyanza E.C., Thomas D.S.K., Jahanpour O & Dewey D (2021). *The sources and chemical content of edible soil sticks sold in markets in Tanzania:* a cross-sectional analytical study. Environ. Geochem. Health. 2019;41:893–906.

Norman I.D., Binka F.N & Godi A.H (2021). Geophagia: a cultural-nutrition health seeking behaviour with no redeeming psycho-social qualities. *South Eastern European Journal of Public Health.* 2015:2014–2038.

Nyanza E.C., Joseph M., Premji S.S., Thomas D.S.K., Mannion C. Geophagy practices and the content of chemical elements in the soil eaten by pregnant women in artisanal and small scale gold mining communities in Tanzania. BMC Pregnancy Childbirth. 2014;14:144.

Ngozi, P. O. (2008). Pica practices of pregnant women in Nairobi, *Kenya. East African Medical Journal* 85(2): 72-79

Okereke J.N., Obasi K.O., Nwadike P.O., Ezeji E.U &Udebuani A.C (2015). Geo-helminthes associated with geophagic pupils in selected primary schools in Oyi, Anambra State. *Sci. J. Publ. Health*. 2015;3(5-1):45–50.

Okunoye, G.O., Head, C. & Issa, B.G. (2013). Pica in pregnant women with diabetes:Does it really exist? *British Journal of Diabetes And Vascular Disease* 13(4): 183-186.

Pfeiffer, C.C. and Mailloux, B.S. (1987). Excess Copper as a Factor in Human Diseases. *Journal of Orthomolecular Medicine* 2(3) retrieved from http://orthomolecular.org /library/jom/1987/pdf/1987-v02n03-p171.pdf

Parry-Jones, B. (1991). *Historical terminology of eating disorders.* Psychological Medicine 21: 21-28.

Parry-Jones, B., & Parry-Jones, W.L. (1992). Pica: Symptom or eating disorder? A historical assessment. *British Journal of Psychiatry* 160: 341-354.

Singh, A. P. (2013). Pica – A Case report on eating disorder of rural adolescent girl. *International Journal of Scientific and Research Publications* 3(9): 1-5.

G Sule, S. & Madugu, H. N. (2001). Pica in pregnant women in Zaria, Nigeria. *Nigerian Journal of Medicine* 10 (1): 25-27

Woywodt A., Kiss A. (2002). Geophagia: the history of Earth eating. *J. R. Soc. Med*. 95, 143–146. 10.1258/jrsm.95.3.143

Young S.L (2021). *Pica in pregnancy*: new ideas about an old condition. Annu. Rev. Nutr. 2010;21:403–422.

Young S.L & Miller J.D (2021). Medicine beneath your feet: *a biocultural examination of the risks and benefits of geophagy*. Clay Miner. 2019;67(1):81–90.

Zeigbo T.O., Akah P.A., Ofokansi M.N. Kaolin consumption affects serum electrolytes, glucose and amylase levels of pregnant women. *J. Biosci. Med.* 2020;8:160–168.

APPENDICES

QUESTIONNAIRE

Dear respondent,

We are final year students from the Holy Family Nursing and Midwifery Training College, Berekum, conducting research to assess the knowledge, attitudes and practices in regard to geophagia among pregnant women. It is for academic purpose and your identity will not be disclosed so please be at ease and co-operate by giving us your best and honest opinion. Please tick [ ] or write as appropriate.

SECTION A – BACKGROUND INFORMATION / DEMOGRAPHICAL DATA

1. Age:

a.18-24 [ ]

b. 25-30 [ ]

c. 31-39 [ ]

d. 40- 45 [ ]

2. Ethnic Group:

a. Akan [ ]

b. Ewe [ ]

c. Hausa [ ]

d. Dagomba [ ]

e. Others (specify) ……

3. Marital Status:

a. Single [ ]

b. Married [ ]

c. Divorce [ ]

d. Others (specify) ……

4. Religion:

a. Christian [ ]

b. Muslim [ ]

c. Traditional [ ]

d. Others (specify) …….

5. Qualification in school

a. School drop out/Never attended any school [ ]

b. Junior High school Certificate [ ]

c. Senior High School Certificate [ ]

d. GCE/OND [ ]

e. First degree/HND as their highest [ ]

f. Postgraduate degrees. [ ]

SECTION B:

LEVEL OF KNOWLEDGE OF GEOPHAGIA DISORDER AMONG PREGNANT WOMEN

Please mark with X

6. Geophagia posess health benefits during pregnancy by respondents

Yes [ ]

No [ ]

7. Respondents' experience of Geophagia when pregnant

Yes [ ]

No [ ]

Don't know [ ]

8. Respondents' awareness that pregnant women are vulnerable to Geophagia Disorder

Yes [ ]

No [ ]

9. Reasons why earthy-materials are taking in during pregnancy

….……

…….

SECTION C:

ATTITUDES OF PREGNANT WOMEN IN REGARD TO GEOPHAGIA

Please mark with X

10. How many times per day do you consume earthy-materials in a week(own time)?

Once daily [ ]

Twice daily [ ]

Three times [ ]

(Please specify) [ ]

11. In what trimester do you crave and consume earthy-materials the most ?

First trimester [ ]

Second trimester [ ]

Third trimester [ ]

Others (specify) [ ]

12. What time of the day is your preferred time for geophagia

Early in the morning [ ]

Last thing before bedtime [ ]

During day time [ ]

Others (specify) [ ]

SECTION D:

AWARENESS ON PREGNANT WOMEN THAT GEOPHAGIA DISORDER CONSTITUTE A HEALTH RISK FOR BOTH THE MOTHER AND THE CHILD

13. Respondents' awareness that Geophagia Disorder is dangerous for the mother

Yes [ ]

No [ ]

14. Respondents' awareness that Geophagia Disorder is dangerous for the child

Yes [ ]

No [ ]

No answer [ ]

SECTION E:

MEASURES RESPONDENTS' TAKE AGAINST GEOPHAGIA DISORDER WHEN THEY EXPERIENCED IT

15. Respondents' seeking of medical advice while experiencing Geophagia Disorder

Every time I experienced it [ ]

Some of the times I experienced it [ ]

Few of the times I experienced it [ ]

None of the times I experienced it [ ]

No Answer [ ]

…THANK YOU…

NATIONAL CATHOLIC HEALTH SERVICE (DIOCESE OF SUNYANI)
HOLY FAMILY NURSING AND MIDWIFERY TRAINING COLLEGE
BEREKUM

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Fax: 0352222474

Our Ref. HFNMTC/GC/011/11422

Your Ref. .....

Date November 4, 2022

To Whom it May Concern
Berekum Municipality
Berekum - Bono Region

PERMISSION TO CONDUCT RESEARCH

I wish to introduce to you the under listed names of final year students of the College:

1. **Frimpong Rosemond Agyaama Harriet**
2. **Ababio Fosuaa Brempomaa**
3. **Ernestina Appiah Owusu**

As part of the pre-requisite for the award of Diploma in Midwifery, they are to conduct a research study, hence the data collection on **"The level of Knowledge of Geophagia Disorder among Pregnant Women in Berekum"**.

I would be grateful if you could assist them with any material or help they may need to accomplish this task.

Thank you.

Yours faithfully

.....

Ms. Ernestina Mensah
Supervisor

For: Principal

Website: nmtcberekum.edu.gh **E-mail.** nmtcberekum@yahoo.com, nmtcberekum@gmail.com