

ORIGINAL RESEARCH

Geophagia: A cultural-nutrition health-seeking behaviour with no redeeming psycho-social qualities

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Abstract

Aim: We investigated if Geophagia is restricted to only pregnant and lactating women in Ghana. We also investigated if the key driver of Geophagia is poverty and other socio-cultural factors.

Methods: This analysis was part of a broader national study of resilience among the population of Ghana (N=2,000). Regional comparisons were made possible due to the stratified and random selection of representations that were similar in characteristics such as being urban or rural, ethnicity, religion and gender.

Results: It was found that Geophagia was present among both females and males and was not restricted to pregnant and lactating women. Geophagia was not driven by poverty or the lack of formal education or the presence of gainful employment. Geophagia was practiced by both urban and rural residents irrespective of religious proclivities and devotion. The assertion that Geophagia was an instinctive primordial response to gastro-intestinal disturbances was not sustained by the data in this study, although the literature review suggested such in calves and lambs.

Conclusion: In order to address the potential health threats posed by Geophagia, the key cultural drivers need to be studied and understood. We also need to appreciate the shocks and stresses that create such desires. It is not a case of mental illness and it cannot be concluded that Geophagia is driven by a psychiatric disorder. This paper would be disseminated to inform policy in Ghana and beyond.

Keywords: food security, Geophagia, Ghana, poverty, psychiatric disorder, resilience, vulnerability.

Conflicts of interest: None.

Introduction

Geophagia is the deliberate ingestion of soil or non-food substances (1,2). It is also known as Pica (3). There are other types of the practice including pagophagia (ice eating), or coprophagia (feces eating) (4). It is practiced in the United States of America (5,6), in Germany (7), Turkey and other parts of Asia (8-10), and in Australia among the Aborigines (11), as well as Eastern Africa (12), West Africa (13) and in Southern Africa (14,15).

The practice is now common in many nations of the world, irrespective of economic status due to migration and subsequent transfer of culture from one part of the world to the other (13). In other literature, Geophagists are considered to have a psychiatric disorder (16). There are many studies on Geophagia as a cultural-nutrition health-seeking behaviour for pregnant and lactating women. It may also be an instinctive response to gastro-intestinal disturbances (14). Karaoglu et al. (2010) assessed nutritional anaemia in 823 pregnant women in an East Anatolian Province of Turkey. In that study, they found anaemia (Hb <11.0 gr/dl) prevalence in 27.1% of the respondents. Of the anaemic cohort, 50% were deficient in iron, with another 35% being deficient in B₁₂ (8).

In a South African study conducted on calves and lambs on farms in the Barkley West, Postmasburg and Vryburg districts of the Northern Cape and Northwest Province of the Republic of South Africa, geophagia had no relationship to pregnancy or lactation. The study found that suckling calves displayed an insatiable appetite for the Mn rich soil and sometimes licked iron poles, which lead to severe constipation, dehydration and even death within a relatively short time. It was found that *“lesions in the liver of the subjects can be attributed to a sub-acute to chronic form of manganese poisoning”* from the soil eaten by the subjects. *“The calves were situated in an area known as the Ghaap Plateau and have superficial outcrops of manganese-rich dolomitic or carboniferous rock of the Reivilo Formation. The soil on the affected farms contains numerous small round-to-ovoid black-grey Mn rich carboniferous concretions ca. 1-10mm in diameter”* (1).

Abraham, Davies, Solomon et al., (2013:1) have informed us that: *“A review of the literature clearly indicates that geophagia is not limited to any particular age group, race, sex, geographic region or time period, though today the practice is most obviously common amongst the world’s poorer or more tribally-oriented people and is therefore extensive in the tropics.”* (13).

In Ghana, we are also informed by other researchers of the presence of Geophagists (2,17). In the case of Ghana, since Vermeer’s research on Geophagia in the 1970’s, not much appears to have been done on the topic. In almost three decades, only one paper appears to have been published on the topic by Taye and Lartey in 1999, although the focus was not entirely on the prevalence and incidence of the practice in the nation. That study researched *“Pica practice among pregnant Ghanaians with particular emphasis on infant birth-weight and maternal haemoglobin level”*. Again, Tayie in 2004, considered *“the motivational factors and health effects of pica”* in a select site (14). Since then, other studies have been conducted elsewhere including that of Kawai et al., 2009 and also Young et al., 2010 which were carried out in Tanzania, East Africa. The Kawai study considered *“Geophagy (Soil-eating) in relation to anaemia and helminths infection among HIV-Infected Pregnant Women in Tanzania”*. Young focused on the *“association of pica with anaemia and gastrointestinal distress among pregnant women in Zanzibar, Tanzania”* (5,6). These studies, however, were conducted on selected communities in Tanzania and did not truly represent the entire nation.

Although Geophagia is a cultural-nutrition habit among pregnant and lactating women in many emerging economies, it appears that this is a common phenomenon among communities in Sub-Sahara Africa and it is not limited to pregnant women. We seek to assess and document the prevalence of Geophagia in a sample of 2,000 inhabitants in the population

of Ghana in all of its ten administrative regions and to attempt to isolate the cultural underpinnings of this phenomenon. We would not delve into the medical, toxicological and psychiatric inquiry of Geophagia on any particular group. None of the researches referred to, concentrated on the *prevalence* and *incidence* of the practice in the nations in which those researches were conducted. Due to its originality, our work would contribute immensely in understanding the practice of Geophagia, at least in Ghana and the sub-region. The outcome would be truly representational of the nation, and would provide the baseline data for further research. The results would be analyzed and disseminated to inform policy on nutrition, mother to child transmission of lead and other substance poisoning, mother to child transmission of helminthes and other bacteria with the proximate cause to Geophagia.

Methods

Sampling

We were confronted with the difficulty of knowing beforehand the communities in Ghana that practice Geophagia. Thus, targeting only the commonly known ones was not enough in determining the prevalence nationwide. Targeting only pregnant women might also give a higher prevalence rate and limit the study just to them due to the practice's wide association to pregnancy. We decided to target women of reproductive age in order to estimate the prevalence for a wider group. We also expanded this to include men since very little is known about the practice in men, although the practice is common in the generally known sites in Ghana. In the end, we targeted pregnant women, women in general and men in order to estimate the prevalence for a wider group. We assumed 20% of persons in Ghana practiced Geophagia based upon a pilot study conducted in Ashaiman, near Tema Municipality, Ghana. This was part of a broader study on assessing the resilience of four communities within Ghana and to identify the coping mechanisms to the observed effects of climate variability. This was done by asking respondents if they had ever willingly eaten earth or clay. The proportion who answered positively was used to estimate the prevalence. This yielded a sample size of 1,710 with 90% power to detect an effect size of 30% at 5% significance level. A sample size of 2,000 gave a reasonable degree of security against the effects of decline in response and a prevalence level closer to 50%. We randomly selected one or more district, municipality or metropolitan area from each of the ten regions (18). We randomly selected one or more communities from each of that and then used the random walk method to evaluate households within each community till the quota for the region was met (19). Regional comparisons were made possible due to the stratified and random selection of representations.

Literature review and Internet search for national standards on nutrition

We searched through national legislation and grey paper to identify national food and nutritional guidelines or standards to evaluate if there is a nexus to geophagia. Due to the paucity of literature on the subject, we were only able to access the Food and Drug Act, the Standards Board Act and the National Nutritional Policy. We also reviewed newspaper reports on geophagia as part of the build-up for the design of the study instrument. We conducted internet searches at sites such as Biomed Central, National Institute of Health, British Medical Council and accessed journals papers on the topic. The documentary search on the Internet was conducted using carefully designed phrases like, "*Geophagia, a cultural nutritional artifact*," "*Geophagia in Ghana, benefits and risks*," "*Typology of Geophagia, pica, pagophagia (ice eating), coprophagia (feces eating)*," "*Cultural beliefs, red earth eating and well-being*", "*Incidence and Prevalence of geophagia, Ghana only*". We summarized the findings into their respective units, and interpreted them based upon our

skills, knowledge and specialization in public health, risk communication and health promotion.

Statistical analysis

Data was entered into Microsoft Excel 2007, checked for accuracy and consistency to reduce errors. This was then transferred into Stata version 11.0 MP for analysis. Summary statistics such as frequencies, percentages, means and standard deviations were then estimated to compare the prevalence of Geophagia across the various groups and backgrounds. Chi-square and Fisher's exact tests were used to assess the associations between the prevalence of Geophagia and background characteristics, history and its practice as well as differences between males and females in terms of experience with the practice. Significant factors from the tests of association were then used in logistic regression to estimate the relative odds of such practice.

Ethical approval

We applied for Ethical Approval to conduct the study for which approval was granted by the Institutional Review Board of the Ghana Health Service in Protocol dated GHS-ERC 01/11/13.

Study limitations

Many of the papers used in this write-up were the results of research conducted on small groups of people. A key aspect of this study was to document the practice of geophagia nationwide. Despite, due to limited funds, we met several operational challenges. The most difficult of such challenges was the lack of comparison between urban and rural areas for each region. Urban-rural comparison was done at the national level. Despite this observation, we believe that the methodology used in this study was sound. We also covered the entire ten administrative regions of Ghana and believe the sample size is large enough to allow us to generalize the outcome in as far as Ghana is concerned. Nevertheless, in order to assess the true prevalence of geophagia in West Africa, a much bigger study needs to be undertaken in the future.

Results

Overall, mean (\pm SD) age of study participants was 33.3 ± 12.8 years (among individuals, who ever practiced geophagia, mean age was: 35.2 ± 13.0 years).

Basic demographics of Geophagists

From the basic demographics of the respondents, the overall finding is that Geophagia was present in both females and males; in both rich and poor; in both urban and rural residents; and in both the educated and the non-educated individuals. The practice of geophagia was the highest (21.5%) within the 50-59 year age-group and the lowest (9.8%) within the under-20 year olds and this finding was statistically significant ($P<0.05$). It can also be seen that the practice was more predominant among females (26.2%) and this was also highly significant ($P<0.001$) as shown in Table 1.

It is interesting to show through this data that geophagia was not restricted to females, or pregnant and lactating women, but it was also evident among males. Geophagia was also practiced by persons from different socio-economic groups distinguished with respect to education, marital status, religion, and employment.

Ethnicity and Geophagia practice

Among the various ethnic groups in Ghana, Geophagia was highest in the Akan-Other with a figure of 26.4% ($P<0.001$). The Akan-Other would include the indigenous inhabitants of the

Brong Ahafo, Eastern, Central and Western regions of Ghana. In terms of regions, the Eastern Region has the highest geophagists among all the other regions with 35.7% followed by the Upper West region with 22.8% ($P < 0.001$). Type of residence did not have an influence on the practice of Geophagy ($P = 0.138$). Wealth was not a significant factor in the practice of geophagia ($P = 0.082$) (Table 1).

Table 1. Background of respondents and the practice of Geophagia

Characteristic	Number of individuals	Ever practised geophagia [N (%)]	P-value *
<i>Age-group (years):</i>			
<20	244	24 (9.8)	P=0.005
20-29	697	108 (15.5)	
30-39	461	72 (15.6)	
40-49	377	67 (17.8)	
50-59	144	31 (21.5)	
≥60	72	12 (16.7)	
<i>Sex:</i>			
Female	1,049	275 (26.2)	P<0.001
Male	948	39 (4.1)	
<i>Marital status:</i>			
Never married	840	94 (11.2)	P<0.001
Married/cohabiting	1127	209 (18.5)	
Divorced/separated/widowed	29	11 (37.9)	
<i>Religion:</i>			
None	93	25 (26.9)	P<0.001
Christian	1409	212 (15.1)	
Muslim	416	58 (13.9)	
Traditional African	73	19 (26.0)	
<i>Education:</i>			
None	75	26 (34.7)	P<0.001
Primary	565	145 (25.7)	
Secondary	1074	135 (12.6)	
Tertiary	282	8 (2.8)	
<i>Employment status:</i>			
Not employed	375	43 (11.5)	P=0.005
Employed	1619	270 (16.7)	
<i>Occupation:</i>			
Unskilled labour	82	13 (15.9)	P<0.001
Agricultural	167	31 (18.6)	
Clerical/secretarial	53	7 (13.2)	
Professional/managerial	274	8 (2.9)	
Sales and services	454	126 (27.8)	
Skilled craftsmanship	589	85 (14.4)	
<i>Ethnicity:</i>			
Akan-Ashanti	438	57 (13.0)	P<0.001
Akan-Fante	208	23 (11.1)	
Akan-Other	265	70 (26.4)	
Ewe	206	33 (16.0)	
Ga-Dangbe	138	28 (20.3)	
Mole-Dagbani	252	28 (11.1)	
Grussi/Gur	155	31 (20.0)	
Nzema	140	27 (19.3)	

Other	148	16 (10.8)	
<i>Type of residence:</i>			
Urban	1546	233 (15.1)	P=0.138
Rural	451	81 (18.0)	
<i>Current residence:</i>			
<5 years	920	115 (12.5)	P<0.001
5-9 years	605	99 (16.4)	
≥10 years	466	99 (21.2)	
<i>Current community:</i>			
<5 years	366	43 (11.8)	P<0.001
5-9 years	386	48 (12.4)	
≥10 years	1239	221 (17.84)	
<i>Wealth quintile:</i>			
Lowest	12	3 (25.0)	P=0.082
Second	286	47 (16.4)	
Middle	401	63 (15.7)	
Fourth	664	119 (17.9)	
Highest	622	79 (12.7)	
<i>Ever had biological children:</i>			
No	924	84 (9.1)	P<0.001
Yes	1071	230 (21.5)	
<i>Related to people who practice geophagia:</i>			
No	388	14 (3.6)	P<0.001
Yes	1195	300 (25.1)	
Total	2000	314 (15.7)	

* P-values from chi-square test and Fisher's exact test in cases when the expected cell frequencies were <5.

Although the practice was highest within those with no formal education and those engaged in sales and service providers, this was not significant in determining familiarity with geophagia, or the lack of it.

We also asked whether geophagia was a commonly known phenomenon (Table 2). It was found that, of the respondents who had ever practiced geophagia, 19.3% of them had heard of geophagia elsewhere and another 19.8% had witnessed this practice.

History and practice of Geophagia among the sexes

We also considered the history and practice of Geophagia. The data showed that females had started the practice at a much earlier age compared to males (P<0.001). The practice being a social conduct, many of the users learned the habit from family members and friends.

Cultural nutrition health-seeking behaviour

The data in Table 2 also seems to suggest that Geophagia is a culturally sanctioned activity between relatives, husbands and wives, as well as the children. Geophagia was not driven by poverty, the lack of formal education, or the presence of gainful employment. In Table 2 respondents who had ever been pregnant and practiced geophagia before, provide interesting insights into the social conduct. Only a small fraction of the respondents (19.3%) accepted or agreed with the notion that Geophagia is practiced by only pregnant women. While 92% of the respondents stated that their desire to eat dirt is stronger when pregnant, (42%) reported that they had strong desire to eat earth even when not pregnant. We did not see any evidence that supported the notion that Geophagia was an instinctive primal response to gastro-

intestinal disturbances, although in the literature review, a study conducted in the Cape region of South Africa among calves and lambs on a farm supported this notion (1). That study also found that when the farmer withdrew the older calves from the Mn rich soil, they did not demonstrate signs of withdrawal but fed normally without the display of appetite for the Mn rich soil.

Table 2. History and practice of geophagia by sex of survey participants

History and practice	Number (percentage)			P-value *
	Female	Male	Total	
<i>Age when geophagia started:</i>				
<20 years	138 (50.2)	22 (56.4)	160 (51.0)	P<0.001
20-29 years	128 (46.6)	5 (12.8)	133 (42.4)	
≥30 years	3 (1.1)	11 (28.2)	14 (4.5)	
Do not remember	4 (1.5)	0	4 (1.3)	
<i>Last time of eating earth:</i>				
<1 month	103 (37.5)	7 (18.0)	110 (35.0)	P<0.001
1-12 months	55 (20.0)	4 (10.3)	59 (18.8)	
>1 year	114 (41.5)	26 (66.7)	140 (44.6)	
<i>Frequency of eating earth:</i>				
Daily	227 (82.6)	5 (12.8)	232 (73.9)	P<0.001
Weekly	36 (13.1)	19 (48.7)	55 (17.5)	
Monthly	5 (1.8)	8 (20.5)	13 (4.1)	
Yearly	1 (0.4)	3 (7.7)	4 (1.3)	
<i>Geophagia hidden from others:</i>				
No	191 (69.5)	16 (41.0)	207 (65.9)	P<0.001
Yes	81 (29.5)	21 (53.9)	102 (32.5)	
<i>Geophagia hidden from:</i>				
Partner/spouse	39 (14.2)	4 (10.3)	43 (13.7)	P=0.200
Parents	47 (17.1)	13 (33.3)	60 (19.1)	
Siblings	10 (3.6)	6 (15.4)	16 (5.1)	
Other family	27 (9.8)	10 (25.6)	37 (11.8)	
Friends	13 (4.7)	6 (15.4)	19 (6.1)	
<i>Learnt geophagia from:</i>				
No one	60 (21.8)	1 (2.6)	61 (19.4)	P<0.001
Family	139 (50.6)	36 (92.3)	175 (55.7)	
Friends	53 (19.3)	1 (2.6)	54 (17.2)	
Both	3 (1.1)	0	3 (1.0)	
<i>Ever had a health problem due to geophagia:</i>				
No	249 (90.6)	38 (97.4)	287 (91.4)	P=0.055
Yes	25 (9.1)	0	25 (8.0)	
<i>Desire to eat earth stronger than food sometimes:</i>				
No	197 (71.6)	38 (97.4)	235 (74.8)	P<0.001
Yes	77 (28.0)	0	77 (24.5)	
<i>Desire to eat earth heightens after rain:</i>				
No	233 (84.7)	34 (87.2)	267 (85.0)	P=0.624
Yes	41 (14.9)	4 (10.3)	45 (14.3)	
<i>Reason:</i>				
Smell	40 (14.6)	4 (10.3)	44 (14.0)	P=0.676
<i>Earth collected by self:</i>				P=0.648

No	261 (94.9)	36 (92.3)	297 (94.6)	
Yes	10 (3.6)	2 (5.1)	12 (3.8)	
<i>Other usual ways of acquiring earth:</i>				
Buying	249 (90.6)	20 (51.3)	269 (85.7)	P<0.001
From family	8 (2.9)	15 (38.5)	23 (7.3)	
From friends	3 (1.1)	0	3 (1.0)	
<i>Mode of consumption:</i>				
Chewed	215 (78.2)	28 (71.8)	243 (77.4)	
Licked	58 (21.1)	7 (18.0)	65 (20.7)	P<0.001
As a drink	0	3 (7.7)	3 (1.0)	
<i>Additives added to earth before consumption:</i>				
No	266 (96.7)	37 (94.9)	303 (96.5)	P=1.000
Yes	8 (2.9)	1 (2.6)	9 (2.9)	
<i>Time of day earth is normally eaten:</i>				
Before meals	2 (0.7)	0	2 (0.6)	P=0.486
After meals	23 (8.4)	1 (2.6)	24 (7.6)	
No particular time	248 (90.2)	37 (94.9)	285 (90.8)	
Total	275 (100.0)	39 (100.0)	314 (100.0)	

* P-values from chi-square test and Fisher's exact test in cases when the expected cell frequencies were <5.

Relative odds of practising Geophagia based on demographics

It was also noticed that females were more likely than males to practice geophagia: OR=8.28, 95%CI=5.84-11.74, P<0.001 (Table 3). This was still significant at almost the same level after adjusting for the other variables in the model, i.e. after taking those other characteristics into account.

Among different age-groups, 50-59 year olds were most likely (2.51 times) to practice geophagia compared to the under-20 year olds. However, this was not significant after adjusting for the other variables although they were still the most likely group to do so (OR=2.90, 95% CI=0.88-9.58, P=0.555).

The odds were against the divorcee, widowed and separated persons who were 4.85 times more likely to find comfort in eating earth than the married, cohabiting and those who had never married; this was however not significant after adjustment.

Table 3. Relative odds of practising geophagia based on background characteristics

Characteristic	Crude		Adjusted	
	OR (95% CI)	P-value	OR (95% CI)	P-value
<i>Age (years):</i>				
<20	1.00 (reference)		1.00 (reference)	
20-29	1.68 (1.05, 2.69)		2.34 (0.85, 6.45)	
30-39	1.69 (1.03, 2.77)	P=0.005	2.32 (0.79, 6.86)	P=0.558
40-49	1.98 (1.20, 3.26)		2.68 (0.89, 8.08)	
50-59	2.51 (1.41, 4.49)		3.06 (0.94, 9.94)	
≥60	1.83 (0.87, 3.88)		3.00 (0.73, 12.33)	
<i>Sex:</i>				
Male	1.00 (reference)	P<0.001	1.00 (reference)	P<0.001
Female	8.28 (5.84, 11.74)		7.73 (4.99, 11.96)	

<i>Marital status:</i>				
Never married	1.00 (reference)	P<0.001	1.00 (reference)	P=0.348
Married/cohabiting	1.81 (1.39, 2.35)		1.34 (0.88, 2.06)	
Divorced/separated/widowed	4.85 (2.22, 10.58)		1.87 (0.44, 8.03)	
<i>Religion:</i>				
None	1.00 (reference)	P<0.001	1.00 (reference)	P=0.005
Christian	0.48 (0.30, 0.78)		0.59 (0.32, 1.12)	
Muslim	0.44 (0.26, 0.75)		0.44 (0.23, 0.86)	
Traditional African	0.96 (0.48, 1.92)		0.91 (0.38, 2.20)	
<i>Education:</i>				
None	1.00 (reference)	P<0.001	1.00 (reference)	P<0.001
Primary	0.65 (0.39, 1.09)		0.87 (0.44, 1.70)	
Secondary	0.27 (0.16, 0.45)		0.50 (0.24, 1.03)	
Tertiary	0.06 (0.02, 0.13)		0.17 (0.05, 0.59)	
<i>Employment status:</i>				
Not employed	1.00 (reference)	P<0.001	Omitted due to collinearity	
Employed	1.54 (1.10, 2.18)			
<i>Occupation:</i>				
Unskilled labour	1.00 (reference)	P<0.001	1.00 (reference)	P=0.512
Agricultural	1.21 (0.60, 2.46)		0.96 (0.42, 2.20)	
Clerical/secretarial	0.81 (0.30, 2.18)		1.08 (0.34, 3.42)	
Professional/managerial	0.16 (0.06, 0.40)		0.64 (0.20, 2.03)	
Sales and services	2.04 (1.09, 3.82)		1.37 (0.69, 2.75)	
Skilled craftsmanship	0.90 (0.47, 1.69)		1.33 (0.65, 2.73)	

Discussion

In this study we have been able to show that Geophagia was not caused by food scarcity or insecurity. Even in the farming communities of Ghana, particularly in Western, Brong Ahafo, Ashanti and Eastern regions where the average household has access to food grown on their own farms, geophagia was practiced all year round irrespective of food availability or harvest.

In order to address the potential health threats posed by Geophagia, the key cultural drivers need to be studied and understood. We also need to appreciate the shocks and stresses that create such desires. But first, we need to get the scientific data right without co-mingling it with social analyses. Anything short of this would prolong the debate about whether Geophagia is a cultural-nutrition health-seeking behaviour, or just a mere cultural imperative without redeeming psycho-social qualities (1,15,16).

From the published papers accessed in this paper, we have noticed that, part of the reasons for the debate is that it appears many of the researchers try to explain the outcome of a purely laboratory investigation of the substances involved in geophagia within the cultural context (13). At other times, they attempt to explain the outcome of their social investigation of the behaviour, such as knowledge and attitude associated with the practice, with scientifically oriented language supported by laboratory measurements and equivalencies (14,16,17).

There is a mixture of purposes and, therefore, the literature on Geophagia is replete with claims and counter-claims or findings by the same researchers within the same studies (3,13,21). An example of a purely scientific research which was reported as such was conducted by Dreyer et al. in 2004 (21). They conducted biochemical investigations into Geophagia among certain ethnic group in Southern Africa and concluded that eating black earth among pregnant women in Southern Africa may be beneficial to them and may retard

the loss of iron and other properties. They reported that: *“Absorbent properties for sodium of black earth, though notable, were not homoeostatically significant. Intake was estimated at only 7.5% of dietary guidelines, yet the serum concentration was normal. The same applies to magnesium. This was liberated from black earth in quite large amounts, dietary intake exceeded the RDA (120%) and yet the serum concentration again was normal. Intake of calcium was below the RDA (43.5%), while the serum concentration was normal. Possibly, the calcium liberated from black earth actually functioned as a dietary supplement.”*

On the basis of the outcome of their study, Dreyer cautioned that before attributing adverse or beneficial outcomes to geophagia, the ion-exchange capacity of the substance in question should be evaluated. Dreyer et al. did not attempt to extend their findings to any other issue except what they investigated. However, Nesor, De Vries, et al. (2000) also conducted a purely scientific inquiry into *‘enzootic geophagia of calves and lambs’* in the Cape region of South Africa and concluded among other laboratory findings that: *“the cause of geophagia may not be completely understood”*. The inquiry was not a cause-effect study (1).

Woymodt and Kiss (2002:143) took the historical approach to understand the practice. In their review of the history of geophagia, they suggested that geophagia was an artifact of poverty, that *“where poverty and famine are implicated, earth may serve as an appetite suppressant and filler”* (3). That is to say, Geophagia was an aspect of resilient building or adaptive capacity against food insecurity and food scarcity (16). Although Woymodt and Kiss had previously maintained that Geophagia was associated with poverty, they made immediate reversal of opinion that *“geophagia is often observed in the absence of hunger”*, but that it is *“environmentally and culturally driven”* (3). In the conclusion of their paper, they reversed themselves again that *“the re-emergency of Geophagia might be triggered by famine, cultural-change and psychiatric diseases”*. To underscore geophagia as a psychiatric disease, Woymodt and Kiss quote from Gabriel Garcia Marquez’s *‘One Hundred Years of Solitude’*, in which one of the novel heroines: *‘Rebecca got up in the middle of the night and ate handfuls of dirt in the garden with a suicidal drive, weeping with pain and fury, chewing tender earthworms and chipping her tooth on snail shells’*.

Researchers accorded and inured Geophagia with neurosis or psychiatric disorder as exemplified in the apparently hysterical manner the apparently already crazy Rebecca was *‘chewing tender earthworms and chipping her tooth on snail shells’* (20). Even though she was in pain, Rebecca continued to chew the dirt, perhaps due to her apparent pre-existing mental disorder. Such conclusions were reached in other scientific publications long before the cultural dimensions of the practice were subjected to empirical investigations (17). Granted, Rebecca is a fictitious character created out of a fertile, probably, male-centric mind (16,20). Despite this statement, the thought that Geophagia is a primal response to psychosomatic episode lingers on.

For researchers to conclude that Geophagia is a psychiatric disorder there has to be empirical studies to confirm this suspicion. Without a contextual and clinical evaluation of a particular Geophagist, it cannot be said that Geophagia is driven by a psychiatric disorder. It appears the outcome reported in this study, debunks the thinking that Geophagia is a sign of psychiatric condition.

Conclusion

In this study, we have provided evidence that geophagia is not restricted to pregnant and lactating women and that it is a general practice among certain groups of people in Ghana, West Africa. We have proffered that, at least in Ghana, Geophagia is a cultural-nutritional, health-seeking behaviour. It is not a conduct which is practiced because of famine or food insecurity, but because of the utilitarian value derived from it. There is also no study on the

phenomenon on this level that has been published on Ghana. Therefore, this study brings to light all the findings associated with the practice of Geophagia. In order not to confuse good laboratory investigation with the cultural impetus that drives the practice of geophagia, researchers of this behaviour need to focus their research questions on specific issues of the conduct. Where there is comingling of cultural analyses with laboratory results, a great deal of confusion may be created, which may lead to the wrong inferences or interventions if need be.

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