

# Parasite Contamination Of Nigerian Currency (Paper and Polymer Notes) In The Ihiala Local Government Area Of Anambra State, Nigeria.

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## Abstract

A six month study (July – Dec, 2010) was carried out in the Ihiala Local Government Area of Anambra State, to ascertain the parasite contamination of Nigeria Currency notes. A total of six hundred and forty (640) samples of N5, N10, N20, N50, N100, N200, N500 and N1000 denominations of both paper and polymer naira notes were collected from food vendors, churches, students, beggars, and banks in Ihiala L.G.A. They were grouped into polymer and paper notes and thereafter separated based on their physical appearances viz: mint, clean, dirty, very dirty and mutilated. Each currency of both paper and polymer notes were rinsed with normal saline and the solution centrifuged and then examined microscopically for parasite cyst and eggs. Hands used in counting the money were also swabbed separately and examined for parasite. Out of Six hundred and forty samples (640) examined, four hundred (400) were paper notes with 110 (27.5%) parasite contaminated on their surface, while two hundred and forty (240) were polymer notes with 14(5.8%) found contaminated with parasites. The isolated parasites were *Entamoeba histolytica* (9%) *S* (2%), Flagellates (3.5%) and lice(1.5%). The mutilated and very dirty notes were the most contaminated in both paper and polymer (55.6% and 12.2%) respectively. For denominations in paper currency, five naira notes were the most contaminated with (52%) while one thousand naira notes were the least contaminated (12%). For polymer, twenty naira notes were the most contaminated 11.1% while fifty naira were the least contaminated with (5%) five percent. Hands examination after counting money revealed eggs of mites, hookworm and *Taenia* spp which were only found in paper notes while in polymer no parasites were found. The study showed that dirty naira notes are potential routes for parasitic transmission to man during handling.

## INTRODUCTION

Money is used as a medium of exchange for goods and services, settlement of debts and for deferred payments in economic activities (Beg and Fisher, 1997). Trade by batter which have been used for exchange, gave way to the age of paper money. The essence of money is now laid bare. Money is wanted not for its own sake but for things it will buy (Samuelson and Nordhaus, 2002). In Nigeria, the currency is highly abused especially in the manner by which it is handled. Presently, it is commonly seen faded, torn, stapled, cellotaped, squeezed and writing on them. The contamination of the naira notes could also be from several sources, it could be from the atmosphere, during storage, usage, handling or production (Matur, et. al. 2008). Daily transactions have made the naira notes to pass through many hands or is placed in a dirt spots and pathogens become imposed on them. Awodi et. al., (2000), reported that the

source of contamination could be as a result of poor or negative money handling practices like spraying during ceremonies, here the notes are Sprayed on the celebrant(s) and in the process fall on the ground where a large number of people dancing, step on them with soiled shoes or even bare ground. This resulted to a considerable amount of physical dirt/mutilated on the naira notes.

Parasites are organisms that is entirely dependent on another organisms (hosts) and are capable of causing harm to their host. Parasites that have been observed to be contaminants of the naira notes are mainly of faecal origin (Jolaoso, 1991). When hands used in cleaning up the anus after passing out faeces are not properly washed and are used in touching the naira notes in any way, there is tendency that there will be contamination with trophozite of the developed parasites. Other way by which the currency can be contaminated such as tongue – wets of fingers with saliva or use of

contaminated water to lubricate the hand in counting lead to possible transfer of parasites to the notes (Ameh and Balogun, 1997). These studies heightened our suspicion that such dirty notes could also harbour parasite cysts and eggs especially in the light of the high prevalence of parasite cysts and eggs especially in the light of the high prevalence of parasitic infections in the unhygienic Nigerian environment.

This research was designed with the objective of studying the prevalence of parasitic contamination of Nigerian currency notes (paper & Polymer) and also hands used in counting the money

## **MATERIALS AND METHODS**

### **STUDY AREA**

The study was conducted in Ihiala Local Government Area of Anambra State, Nigeria. It is located between Latitude 6 8<sup>1</sup> N of the equator and longitude 7 35<sup>1</sup> E of the meridian. The mean annual rainfall and temperature are 350mm and 28 C, respectively. The area has a population of 87, 796 persons. The occupation of the people is mainly subsistence farming, sometimes combined with petty trading. They have a conventional based University (Anambra State University, Uli) in the area.

### **COLLECTION OF NIGERIA CURRENCY (PAPER & POLYMER NOTES)**

A total of six hundred and forty Nigeria currency notes which comprises four hundred (400) polymer notes and two hundred and forty (240) paper notes were collected for this research. Collection was made from food vendors, beggars, motor – parks, churches, students and bank in Uli, Ihiala Local Government Anambra State between July to December 2010. The notes were collected with hands covered with hand gloves into a sterile polythene bags and then conveyed to life science laboratory for investigation. The notes were later separated and categorized based on the level of dirt on them and their physical appearance (mint, Clean, dirty, very dirty and mutilated).

### **EXAMINATION OF NIGERIAN CURRENCY FOR PARASITIC INFECTION**

Each naira note was swabbed using swab stick and thereafter folded and inserted into a sterile bottle and 10ml of normal saline was poured on each of the currency notes using a 10ml syringe. Each bottle was covered and shaken vigorously then left standing for 15 minutes, and shaken for the last time. The notes were removed using a pair of forceps

and transferred to a sterile polythene bag. The contents of each bottle were poured into a centrifuge tube and centrifuged at 200rpm for 3 minutes. The supernatant was decanted while the resultant sediment was stirred and a drop placed on a clean slide and covered with cover glass and examined microscopically (x10 and x40) for parasite cysts and eggs (Jeffrey and Leach, 1975; Cheebrough, 1992) was made to identify the cysts and eggs observed.

### **EXAMINATION OF HANDS FOR CYSTS/OOCYSTS AND EGGS AFTER COUNTING DIRTY NOTES**

To discover whether in the process of counting dirty naira notes, parasite eggs and cysts if present were transferred to the hands and the analysis was conducted on both paper and polymer separately. Firstly hands were thoroughly washed with soap and cleaned with 70% of ethanol. Thereafter, assorted dirty notes were then counted, the hands were swabbed with swab stick and further examined for parasite cysts and eggs as described above.

## **RESULTS**

Of the four hundred (400) samples examined for parasite contamination on paper notes, Table 1 depicts that 110 (27.5%) of the 400 paper notes sampled were contaminated on their surfaces with parasite cysts and eggs. No cysts and eggs were found on mint and clean notes. The mutilated naira notes had the highest parasite contamination with (64.8%) followed by very dirty notes (29.15%) while dirty naira notes had the least parasitic contamination with 23.75%. It was also observed that the lower denominations were more contaminated with 52% while the higher denominations had the least contamination with 10% respectively. There was a positive association between the presence of dirt on the notes and contamination with parasite eggs and cysts ( $P > 0.05$ )

Parasite eggs and cysts discovered in the currency were six of them. *Ascaris lumbricoides* 30 (7.5%), hookworm ova 16(4%), *Trichuris trichura* 14(3.5%) *Enterobius vermicularis* 8(2.0%), *Entamoeba histolytica* 26(6.5%) and flagellates 14 (3.5%) five of these were isolated from mutilated and very dirty notes respectively. Parasites were also discovered from counting of assorted dirty and mutilated notes. Parasites found after the analysis are hookworm eggs and taenia species from the hands 10 (16.7%)

**Parasite Contamination Of Nigerian Currency (Paper and Polymer Notes) In The Ihiala Local Government Area Of Anambere State, Nigeria.**

**Figure 1**

TABLE 1: Prevalence of Parasite Contamination on Nigerian Currency Notes (paper)

Status of naira note	DENOMINATION											
	N 5		N 10		N 20		N 50		N 100		Total	
	X	Y(%)	X	Y(%)	X	Y(%)	X	Y(%)	X	Y(%)	X	Y(%)
Mint	10	0	12	0	4	0	8	0	6	0	14	0
Clean	14	0	6	0	4	0	12	0	8	0	6	0
Dirty	4	4	8	4	20	8	10	1	6	0	10	2
Very Dirty	6	6	4	1	16	4	6	4	20	0	04	4
Mutilated	16	16	20	16	6	4	14	8	10	6	16	8
Total	50	26(52%)	50	21(42)	50	16(32)	50	13(26)	50	6(12)	50	14(28)
											50	7(14)
											50	5(10)
											400	110(27.5)

**KEY**

X = Number of sample examined

Y = Number of Samples contaminated with parasite eggs or Cyst

N = Naira

The results of the studies on the prevalence of parasite contamination on Polymer are shown in table 2. Paper notes had higher prevalence rate (27.5%) than polymer notes (4.6%). Of the 240 currency of polymer notes sampled 11(4.6%) were contaminated on their surfaces with parasites. The mutilated notes had the most parasitic contamination of cysts and egg of (14.1%) this was followed by very dirty notes (2.9%) while the least currency contaminated was the dirty notes with (2.6%) respectively. Mint and clean notes harbor no parasite. The results also depicted that twenty naira notes (N20.00) were the most contaminated with (8.3%) while the least contaminated was fifty naira notes (N50.00) Ten naira notes (10.00) had no parasitic contamination, it does not mean that it is free from parasite contamination but it was not found in the analysis conducted. The cysts and ova isolated include: *Ascaris lumbricoides* 6(2.5%), hookworm 1(0.08%) and *Entamoeba histolytica* 6(2.5%).

Counting 60 bunches of assorted dirty notes, no parasite were recovered after the analysis. This could be attributed to the nature (or types) of the currency which is slippery during counting unlike the previous method, which is taking time to rinse the notes, before the analysis.

**Figure 2**

TABLE 2: Prevalence of parasite contamination of cysts and eggs isolated from polymer notes using rinse method.

Status of naira note	N 5		N 10		N 20		N 50		N 100	
	X	Y(%)	X	Y(%)	X	Y(%)	X	Y(%)	X	Y(%)
Mint	14	0(0)	12	0	4	0	8	0	6	0
Clean	22	0(0)	6	0	4	0	12	0	8	0
Dirty	10	0(0)	8	4	20	8	10	1	6	0
Very Dirty	10	0(0)	4	1	16	4	6	4	20	0
Mutilated	24	4(16.7)	20	16	6	4	14	8	10	6
Total	80	4(5.0%)	48	0	72	6(8.3)	40	1(2.5)	240	11(4.6)

**KEY**

X = Number of samples examined

Y = Number of Samples contaminated with parasite eggs or Cyst

N = Naira

**DISCUSSION**

The isolation of parasitic contaminants from the currency notes in the study confirmed that currency acted as an agent (vector) playing an important role in the transmission of pathogenic micro organisms (Ogo et. al., 2002\4). A prevalence rate of 33.3% was recorded for cysts and ova of parasites on dirty naira notes. This is in agreement with the finding of Dada and Bellino (1979) and Edungbola and Obi (1992) that dirty naira notes are a potential source of contracting infections. Studies have revealed that parasite cysts and ova are mot prevalent on very dirty objects, and mutilated materials and currency notes, while mint and clean notes harbors no parasite. The report of (fashuyi, 1983) is in consonance with this fact.

The result showed that the denominations of notes did not influence the level of contamination although, the five and twenty naira notes were mostly contaminated. This is not unconnected to the methods of handling the currently notes, it is also a reflection of the present poor economic situation in our country where the naira notes is highly devalued to the extent that higher denominations have suddenly become readily available at all levels of daily transactions. Parasite cysts and ova isolated from currency notes are those of high socio-economic importance that pose danger and great health implication to man. Seventy percent (70%) of parasites isolated can be transmitted through the oral route. This becomes more worrisome when it is considered in Nigeria were many people tongue – wet their fingers when

counting money thereby contaminating the naira notes has been revealed through poor handling Practices including spraying during ceremonies and dirty hands contaminated with human and animal faecal particles (Adelowo, 1990).

From the analysis a significant difference was observed in between paper and polymer respectively. Based on denominations it was observed that the gap/number of currently infected by the parasites cannot statistically bridged.

In conclusion, handling money is like shaking hands with somebody, these activities not only enhance currency contamination but may increase the risk of infections from contaminated notes. It was recommended that more awareness campaign and seminars should be created both in rural and urban areas of the Federation because it is only our identity in terms of transaction. Similar studies on both parasitic and microbial contaminants of currency notes should be undertaken in other countries to enrich the global information bank on the subject, the issue is becoming a major public health concern.

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