

## A Survey of Parasite Cysts, Eggs and Bacteria on Nigerian Currency in FCT, Abuja

<sup>1</sup>Matur, Bernard Malau, <sup>1</sup>Malann, Yoila David and <sup>1</sup>Edhomeriegue, Yvoun

<sup>1</sup>University of Abuja,  
Department of Biological Sciences,  
P.M.B 117,  
Federal Capital Territory Abuja,  
Nigeria (+234)

[malaumatur@yahoo.com](mailto:malaumatur@yahoo.com), [malannyd@yahoo.com](mailto:malannyd@yahoo.com)

**ABSTRACT:** A survey of parasites cysts and eggs and bacteria as contaminants of the Nigerian naira notes in circulation in the Federal capital territory (FCT) Abuja was carried out between April and May 2008. A Total of Two hundred (200) naira notes of N5, N10, N20, N50, N100, N200, N500 and N1000 denominations, were collected in separate polythene bags from traders, beggars, motor-parks, students of University of Abuja, food vendors, individuals and banks. Collection was based on their denomination (with 25 samples per denomination) and physical appearances (clean, dirty, very dirty and mutilated). Each naira note was rinsed in sterile normal saline and the solution was concentrated using the centrifuge machine and examine microscopically to recover parasite eggs and cysts and part of the solution cultured in Medias of MacConkey agar, CLED agar and Chocolate agar to recover the presence of bacteria. Of the two hundred naira notes examined 32% (64) were contaminated with various species of parasites and 58% (116) with bacteria species while the mints harbour no contamination. The parasites encountered include *Ascaris lumbricoides* eggs (4.5%), Hookworm ova (8.5%), Lice of the genus *Pediculus humanus corporis* (5.0%), *Enterobius vermicularis* eggs (0.5%), flagellates cysts (1.5%) and *Entamoeba histolytica* cysts (12.5%). Bacteria isolated after culture were *Staphylococcus spp* (30.5%), *Escherichia coli* (9.0%), *Klebsiella spp* (6.5%), *Pseudomonas spp* (6.5%) and *Proteus spp* (5.5%). The study reveals that dirty naira notes are potential vehicles for pathogens and parasitic infections to man during handling ( $\chi^2 = 36.02$ ;  $df=7$ ;  $p<0.05$ ) and ( $\chi^2 = 60.75$ ;  $df=7$ ;  $p<0.05$  for bacteria and parasites respectively). [New York Science Journal. 2010;3(1):10-13]. (ISSN: 1554-0200).

**KEYWORDS:** Naira notes, Parasites, Bacteria, Contamination, FCT, Abuja.

### INTRODUCTION

Money is used as a medium for exchange for goods and services, settlement of debts and for deferred payments in economic activities (Beg and Fisher, 1997). In Nigeria, the naira notes presently in circulation are abused by squeezing, stapling, torn, cello taped, ripped faded and writings 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 (Awodi *et al.*, 2000). Daily transactions have made the naira to pass through many hands and pathogens become imposed on them. Ogo *et al.* (2004), reported that the source of contamination could be as a result of poor or negative money handling practices like spraying during ceremonies where such notes may be trampled upon when they fall on the ground.

Parasites are organisms that live in a close relationship with other 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 (Awodi, *et al.*, 2000). When hands used in cleaning up the anus after passing out faeces are not properly washed and are used to touching the naira note in any way, the tendency is contamination with the trophozoite of the developed parasite, eggs, cysts or even the oocyst. Other attitudes such as the wetting of hands or fingers with saliva or use of contaminated water to lubricate the hand in counting money could lead to possible transfer of parasite and bacteria from such medium to the notes (Ameh and Balogun, 1997).

Bacteria are particularly very ubiquitous their ability to contaminate objects such as the naira notes is very prevalent when compared to parasite. Ordinarily, the exposure of naira notes to the atmosphere could even bring about contamination depending on the environment in question (Ameh and Balogun, 1997). Since the isolation of bacterial

and fungal organisms from naira notes in Zaria (Ameh and Balogun, 1997) and the effect of parasitic and bacterial organisms on man it has become necessary for thorough investigations to be carried out to determine safety of the naira note.

This study was aimed at isolating, identifying and determining the level of contamination of the naira notes with bacterial and parasitic pathogens in the Federal Capital Territory (FCT) of Nigeria, Abuja.

## MATERIALS AND METHODS

A total of two hundred (200) samples of the Nigerian naira notes consisting of twenty-five (25) pieces of each naira denominations (N5 to N1, 000 notes) were collected. Collection was made from traders, beggars, motor conductors in parks in Abuja metropolis, students of University of Abuja, food vendors and individuals all over FCT Abuja between April and May, 2008. the nature of the notes collected were categorized as follows; clean notes, dirty notes, very dirty notes, very dirty and mutilated notes and mints (fresh notes).

The notes were collected with hands covered with hand gloves into sterile polythene bags according to their denominations and conveyed to the University of Abuja Biology laboratory for analysis. Each currency note was swabbed using swab stick and thereafter folded and inserted into a sterile bottle and 10ml of sterile normal saline was poured on each of the naira note using a 10ml syringe.

Each bottle was covered and shaken vigorously and left standing for 30minutes, then shaken for the last time. The note was removed using a pair of forceps and transferred to a sterile polythene bag. The contents of each bottle was poured into a centrifuge tube and centrifuged at 1,500rpm for 2minutes. The supernatant decanted

while the resultant sediment was stirred and a drop placed on a clean grease free slide and examined microscopically (X10 and X40) for parasite cysts and eggs (Jeffrey and Leach, 1975; Cheesbrough, 1992).

The swab was inoculated into different media (MacConkey agar, CLED agar and Chocolate agar) and streaked. Each media was incubated for 24 hours at 37<sup>o</sup>c and the plates read the following day while observing mixed growth of distinct colonies of individual micro-organisms. Each colony was isolated and further identification carried out using gram staining and bio-chemical test (Willey *et al.*, 2008).

The result was analyzed statistically using the chi-square test.

## RESULTS

Of the two hundred (200) samples examined for both parasite and bacteria 32 (64%) were contaminated with parasites while 116 (58%) had bacterial contamination. The result indicated that the five (5) naira notes had the highest parasite and bacterial load 64% (16) and 100% (25) respectively. Statistical analysis showed the level of parasite and bacteria contamination between the naira denomination to be significantly different ( $\chi^2 = 36.02$ ;  $df=7$ ;  $p<0.05$ ) and ( $\chi^2 = 60.75$ ;  $df=7$ ;  $p<0.05$ ) respectively.

Cyst and ova of six parasites were recovered; *Ascaris lumbricoides* accounted for 4% (8), Hook worm (ova) 8.5% (17), lice 5% (10), *Enterobius vermicularis* 0.5% (1), Flagellates 1.5% (3) and *Entamoeba histolytica* 2.5% (25).

Table 2, showed five bacteria species identified *Staphylococcus spp* 30.5% (61), *Escherichia coli* 9% (18), *Klebsiella spp* 6.5% (13), *Pseudomonas spp* 6.5% (13) and *Proteus spp* 5.5% (11).

**Table 1. Parasites, Cysts and Eggs (ova) isolated from Naira notes using Rinse Method.**

Naira Denomination	NO	% prevalence/NO contaminated						% / total
		<i>A. lumbricoides</i>	Hook Worm (ova)	Lice	<i>E. vermicularis</i>	Flagellates	<i>E. histolytica</i>	
N5	25	16(4)	36(9)	12(3)	0(0)	0(0)	0(0)	64(16)
N10	25	4(1)	12(3)	20(5)	4(1)	0(0)	0(0)	40(10)
N20	25	0(0)	0(0)	4(1)	0(0)	8(2)	0(0)	12(3)
N50	25	0(0)	12(3)	4(1)	0(0)	4(1)	0(0)	20(5)
N100	25	8(2)	4(1)	0(0)	0(0)	0(0)	0(0)	12(3)
N200	25	0(0)	4(1)	0(0)	0(0)	0(0)	4(1)	8(2)
N500	25	4(1)	0(0)	0(0)	0(0)	0(0)	48(12)	52(13)
N1000	25	0(0)	0(0)	0(0)	0(0)	0(0)	48(12)	48(12)
%/Total	200	45(8)	8.5(17)	5(10)	0.5(1)	1.5(3)	12.5(25)	32(64)

**Table 2. Bacteria Isolated from Naira notes using the Swap Method.**

Naira Denomination	NO	% prevalence / no of contaminants					% / total
		<i>Staphylo coccus spp</i>	<i>E. coli</i>	<i>Klebsiella spp</i>	<i>Pseudomonas spp</i>	<i>Proteus spp</i>	
N5	25	52(13)	28(7)	12(3)	4(1)	4(1)	100(25)
N10	25	32(8)	0(0)	16(4)	8(2)	4(1)	60(15)
N20	25	16(4)	0(0)	12(3)	16(4)	8(2)	52(13)
N50	25	44(11)	16(4)	8(2)	4(1)	8(2)	80(20)
N100	25	48(12)	4(1)	0(0)	0(0)	12(3)	64(16)
N200	25	36(9)	20(5)	4(1)	0(0)	4(1)	64(16)
N500	25	16(4)	4(1)	0(0)	20(5)	4(1)	44(11)
N1000	25	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
%/Total	200	30.5(61)	9(18)	6.5(13)	6.5(13)	5.5(11)	58(116)

## DISCUSSION

The result obtained from this study showed that Nigerian currencies in circulation within the Federal Capital Territory (FCT) Abuja and elsewhere are likely to be contaminated with different parasites and bacteria organism as was discovered elsewhere in Nigeria (Ogo *et al.*, 2004; Ameh and Balogun, 1997). A prevalence rate of 32% was recorded for cysts and ova of parasites on dirty naira notes. This is in agreement with the findings of Jolaoso (1991) and Ameh and Balogun (1997) that dirty naira notes are a potential source of contracting disease agents. It was observed that the presence of dirt on the notes was related with the presence of cysts and or eggs of parasites. Once a note had dirt on it, there was a high chance that it could harbour cysts and or eggs of parasites on it.

Studies have revealed that parasite cysts and eggs are most prevalent on very dirty objects and mutilated materials and the naira and other currency, while the mint (fresh notes) had no parasite. The report of (Ogo, *et al.*, 2004) is in consonance with this fact.

The result showed that the denominations of notes did not influence the level of contamination. Although, the five naira note was mostly contaminated this is not unconnected to the methods of handling the naira notes it is also a reflection of the present poor economic situation in Nigeria where the naira is highly devalued to the extent that higher denominations have suddenly become readily available at all levels of daily transactions.

Parasite cysts and eggs isolated from the notes are those of high socio-economic importance that pose danger and great health consequence to man. For instance, *Entamoeba histolytica* and *Ascaris lumbricoides* are easily transmitted orally therefore, it has becomes very worrisome when in

Nigeria were many people tongue-wet their finger when counting money thereby, contaminating their fingers used to handle or eat food without washing of hands. The source of contaminating the naira note has long been discovered to be through poor handling practices including spraying during ceremonies and dirty hands contaminated with human and animal faecal matters (Dada, *et al.*, 1979; Fashuyi, 1983; Adelowo, 1990) and much recent observations incriminating soles of foot-wears carrying cysts and eggs from contaminated soils (Nock *et al.*, 2000).

The contamination of the naira with bacterial organisms showed that these organisms are widely distributed in the environment and so much associated with humans and their metabolic waste, which bores down to the level of personal hygiene. This could be transferred from parts of the body such as the nose and mouth to the note as in the case of *Staphylococcus spp* (Jolaoso, 1991).

In conclusion, the potential health danger of spraying naira notes is obvious and the chances of contracting infection are enhanced by the non-withdrawal of the dirty and mutilated notes from circulation. To help control the spread of these pathogens, it is recommended that the central Bank of Nigeria should enforce laws on unethical handling of the naira and ensure periodic withdrawal of dirty notes from circulation.

## Acknowledgement

We wish to express our profound appreciation to Mr. David Ayeijena and Mrs. J. S. Adelabu for given us the best out of their time. Also, our profound gratitude goes to the Department of Biological for allowing us use its laboratory for this work. The Central Bank of Nigeria (CBN) and other allied Banks were so wonderful and

understanding, without their cooperation this research wouldn't have been a success.

**CORRESPONDENCE:**

Matur Bernard Malau  
Department of Biological Sciences  
University of Abuja, Nigeria  
P. M. B 117, Abuja.  
Cellular phone +234-8036843775  
[malaumatur@yahoo.com](mailto:malaumatur@yahoo.com),  
[malannyd@yahoo.com](mailto:malannyd@yahoo.com)

**REFERENCES**

- Adelowo, O.A. (1990). Intestinal Helminthiasis in a Post-Secondary Institution in Ilorin, Kwara state, Nigeria. *The Nigerian Journal of Parasitology*, 9-11: 91-94
- Ameh, J.B. and Balogun, Y.O. (1997). The health implications of Microbial load of abused Naira notes. *The Spectrums*, 4: 138-140
- Awodi, N.O., Nock, I. H. and Aken'Ova .I. (2000). Prevalence and Public Health Significance of Parasitic Cysts and Eggs on the Nigerian Currency. *The Nigerian Journal of Parasitology*, 22: 137-142.
- Beg, M.O. and Fisher (1997). Major Means of Exchange in the Tropics now and before. *Journal of History*, 4: 13-34
- Cheesbrough, M. (1992). *Medical laboratory Manual for Tropical countries* 2<sup>nd</sup> edition. University Press Cambridge Part 1: 200-357
- Dada, B.J.O. and Bellino, E.D. (1979). Prevalence and Public Health Significance of Helminthes Ova in Dog faeces deposited on the streets of Zaria, Nigeria. *Annals of Tropical Medicine and Parasitology*, 73: 89-90
- Fashuyi, S.A. (1983). The Prevalence of Helminthes eggs in human faeces deposited on the Streets of Lagos. *West African Medical Journal*, 2: 135-138
- Jeffrey, H. and Leach, R.M. (1975). *Atlas of Medical Helminthology and Protozoology* 2nd Edition Longman group Ltd, Hong Kong, 121pp
- Jolaoso, J.I.K (1991). Dirty naira notes as vehicle for bacterial and mould infections and an agent of cross-contamination. *Paper presented at the 19<sup>th</sup> annual conference of the Nigerian society for microbiologists*, September, 1991.
- Nock, I.H. and Tanko, D. (2000). Prevalence and Public Health Significance of Parasite Oocysts and Eggs on the Sole of Shoes: A case study in Zaria, Nigeria. *The Nigerian Journal of Parasitology*, 21: 137-142
- Ogo, N.I., Ajayi, J.A., Ajayi, O.O. and Madukeke, A. (2004). Eggs and Cysts of parasites contaminating Nigerian currency notes. *African Journal of Natural Sciences*, 7: 40-42
- Willey, J.M., Sherwood, L.M. and Woolverton, C.J. (2008). *Prescott, Harley, and Klein's Microbiology* 7<sup>th</sup> Edition. McGraw-Hill, London pp 113-118

7/1/2009