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PARASITES CONTAMINATION AND DISTRIBUTION ON FRUITS AND VEGETABLES IN KOGI, NIGERIA

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ABSTRACT

Parasites contamination and distribution on fruits and vegetables in Kogi Nigeria was carried out to determine the level of parasites contamination and distribution with cysts and larvae of both helminths and pathogenic protozoan between April and October 2010. The vegetables and fruits were bought from sellers and examined for helminth cysts and larvae using concentration technique and centrifuging of the 2426 samples of fruits and vegetable examined 303 (11.87%) were positive for both helminth and pathogenic protozoan cysts and larvae. Out of the three major markets studied, Dekina market recorded the highest odd ratio contamination rate of 1.70% odd ratio. The contamination rates of helminth cysts and larvae found are *strongiloides stercoralis* 147 (6.06%), *Trichuris trichiura* 42 (1.73%) and *Ascaris lumbricoides* 19 (0.78%). The difference was statistically significant ($P < 0.05$) amongst the vegetables examined, bitter leaf (*veronica* species) had the highest contamination rate of 2.66% followed by *Allium cepa* 2.56% while jute leaf (*corchorus olitorus*) was uncontaminated. Amongst the fruits *Piper nigrum* has the highest contamination (28.2%) while okro (*Abelmoschus esculentus*) had the least (1.13%). The public health hazard of these findings depicts the need to give more attention on health education as far as the contamination by parasites cysts and larvae on these consumable fruits and vegetables is concerned.

Key Words: Fruit, Vegetable, Contamination, Parasite, Nigeria

INTRODUCTION

Fresh but raw fruits and vegetables can be agent of transmission of intestinal parasites. Epidemiological data have shown that food cross-contamination during preparation contributes remarkably to the occurrence of food-borne diseases (Gilling *et al.*, (2001); Kusumaningrum *et al.*, (2004); CDC (2009) parasitic diseases have greatly contributed to undermining the health status of the populace thereby jeopardizing the economic development of Nation in tropics. Ukoli (1990) although most parasitic infection is often asymptomatic it may be dangerous to assume that they are innocuous. Changes in agronomic, harvesting, distribution, processing, and consumption patterns and practices have undoubtedly contributed to these fruits and vegetables contamination. Contaminations can occur on the field or orchards during harvesting, transporting, processing distribution and marketing or in the home. Also during post harvest handling including at points of preparation by street vendors, food service establishments and most irrigation water. Various factors contribute to increase in diseases associated with raw fruits and vegetables. They include globalization of food supply. Introduction of pathogens into new geographical areas through import, use of untreated waste water and manure as fertilizers for crop production, irrigation and various agronomic practices, level of hygiene of food handlers etc. Continued use of untreated wastewater and manure as fertilizer for the production of fruits and vegetables is a major contributing factor to contamination that causes numerous food-borne disease outbreaks. (James and Ogochukwu, 2006). Infection can occur after ingestions of as few as 10-25 cysts of parasites. The aim of the current study was to determine parasites contamination of fresh vegetables sold in Kogi Nigeria.

MATERIAL AND METHODS

Study Areas

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The study was conducted in Bassa and Dekina Local Government areas the three major markets and commercial township-of Kogi State middle belt Nigeria between April and October 2010. The following market were used for the study: Anyigba, Bassa and Dekina..Anyigba is located very close to River Benue, Bassa is located close to Lokoja Confluence Township where River Niger and Benue meet. Dekina is daily market are located at the Northern part of Anyigba. Rural farmers usually bring the fruits and vegetables to the markets from nearby villagers and township.

Sample Collection

The fruits and vegetable were bought from the traders in these markets between 006 and 11.00 in the morning. Fruits include *Musa sapientum* (Banana), *Lycopersicum esculentum* (Tomato), *Citrus sinensis* (orange), *Piper nigrum* (pepper), and *Abelmoschus esculentus* (okra) the vegetables are *Amaranthus cruentus* (spanish) *Telferia occidentalis* (pumpkin leave), *Talinum triangulare* (water leaf) and *Corchorus olitorus* (Jute leaf.)

Sample Processing

100g of each type of fruits and vegetable were washed in 360ml of distilled water. Each suspension was strained through a piece of double layered sieve which filtered off coarse sandy particles but allowed the passage of helminth ova and larvae. The filtrate was centrifuge at 2500rpm for one minute. The supernatants were poured off from the different tube to each tube was checked for helminth ova and larvae by the concentration technique as described by Cheesbrough (1998) was used for the identification of the ova and larvae observed.

Chi-square test was used to determine whether any relationship exist between geohelminthic oval larvae and contamination of different fruits and vegetables, type of produce and location of markets.

RESULTS

Table 1 shows the distribution of parasites cysts and larvae by type of vegetables in the study areas. Data revealed that vegetables examined in Dekina market have the highest prevalence rate of 4.50% followed

Table 1: Distribution of Parasites cysts, Ova/Larvae by study area and by type of vegetables in Anyigba, Bassa and Dekina Markets local Government Area Kogi State

Study Area	Amaranthus Cruentus (Green Vegetable)		Telferia Occidentals (Pumpkin Leaf)		Teinum Triangular (Water leaf)		Vernonia Species (Bitter leaf)		Allium Cepa (Onion)	Corchorus Olitorus (jute leaf)		
	Total Examined (%)	No.	Total Examined (%)	No.	Total Examined (%)	No.	Total Examined (%)	No.	Total Examined (%)	Total Examined (%)	No.	OR
Anyigba Market	50.2		30.2		50.1		30.1	0.06	51.8	1.05		1.70
Bassa Market	50.6	1.09	30.6	1.1	50.0	0.98	30.13	1.71	40.13	0.62	30.0	3.86
Dekina Market	50.0	0.88	30.0	0.8	50.6	1.0	30.11	0.89	100.15	0.89		4.50
Total	150.8	2.28	2.26		2.27		2.66		2.56		0.00	9.06

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by Bassa market with 3.86%; while Anyigba market had the lowest infection rate 1.70%. Generally the difference in distribution of parasite infection by age is significant ($P < 0.05$) data also revealed that there is no significant difference among the sample examined in Dekina to that of Bassa market. In table 1 data revealed that among the vegetables examined in all the three study areas, *vernonia* species (Bitter leaf) had the highest rate parasites prevalence 2.66% odd ration followed by *Allium cepa* 2.56% odd ratio while the *corchorus olitorus* jute leaf was uncontaminated in all the study areas.

Table 2 shows the distribution of cysts/larvae on fruit and vegetable by study areas. Data shows the highest and commonest parasites contamination of *Strongiloides stercoralis* larvae 147 (6.06%), followed by, *Trichuris trichura* egg 42 (1.73%) and the cysts of *Balantidium coli* 1 (0.04%) the least.

Table 2: Distribution of Cysts, /Larvae on fruits and vegetable by study area

Total =	Dekina Market N = 854	Bassa Market N = 811	Anyigba market N = 761	Study area
2426				A.
19 (0.78)	0 (0)	16 (1.93)	3 (0.39)	Lumbric
42 (1.73)	10 (1.17)	27 (2.71)	10 (0.13)	oides egg
1 (0.04)	0 (0)	0 (0)	1 (0.13)	T.trichur a egg
15 (0.6)	15 (1.95)	0 (0)	0 (0)	Hookwor m egg
11 (0.45)	7 (0.8)	1 (0.12)	3 (0.39)	F.hepatic
11 (0.45)	11 (1.29)	0 (0)	0 (0)	a egg
7 (0.29)	5 (0.59)	0 (0)	2 (0.26)	uularis
1 (0.04)	1 (0.12)	0 (0)	0 (0)	Cyososp ridium
147 (6.06)	56 (6.25)	36 (3.21)	65 (8.54)	lanc
6 (0.25)	4 (0.47)	11 (1.36)	20 (2.61)	ation
16 (0.66)	1 (0.12)	10 (0.12)	5 (0.66)	Species
6 (0.25)	4 (0.47)	0 (0)	2 (0.26)	Strongi alia
1 (0.04)	0 (0)	1 (0.12)	0 (0)	G.lambli a Cysts
4 (0.16)	2 (0.23)	0 (0)	2 (0.26)	G.histoly tica cyst
6 (0.25)	0 (0)	5 (0.62)	1 (0.13)	buetchlli
2 (0.03)	0 (0)	1 (0.12)	1 (0.13)	B. coli cyst
6 (0.25)	0 (0)	6 (0.74)	0 (0)	Menilli
3 (0.08)	2 (0.25)	1 (0.13)	0 (0)	C. ceyen nen
				I. Belli cyst
				Fullebori
				E. Coli. Cyst

The Numbers in the indicate the percentage positive in each study area.
 N = sample Size

DISCUSSION

Fruits and vegetables contamination could be from several sources, it could be from the atmosphere, during storage, usage, handling or production (Awodi *et al.*, 2000).

Generally, parasites infestations abound in Nigeria not only because of tropical environment with climatic conditions suitable for easy parasite growth and spread, but also as consequence of unsanitary surroundings with constant faced pollution of soil and drinking water. Adeyeba and Essiet (2002).

In this study, the high parasites prevalence and distribution was further enhanced by unhygienic mode of transportation of these consumable products. Also local practice of using organic manure, such as animal and poultry dropping as fertilizer contributed immensely to most of the helminthic diseases rampant in the study areas.

Besides, the washing of fruits and vegetable in an already contaminated streams and rivers gives more room for parasites cyst and ova of which it encystations in the intestine lead to serious parasitic diseases.

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Heavy parasite burdens may cause digestive and nutritional disturbances, blockages of the gut, abdominal pain, vomiting, restlessness, disturbed sleep and perforation of tissues

(James Ikechukwu Mbanugo *et al.*, (2006) of the helminth cysts and larvae found contaminating different fruits and vegetables *strongiloides stercoralis* was the most commonly dated. The two intestinal nematodes that followed closely are *Ascaris lumbricoides* and *Trichuris tichura*. It is estimated that there are 902 million cases world-wide (17% prevalence). Christine *et al.*, (2000) They are large intestinal worms of man and are by far known to be the most widespread and commonest parasites of man in tropical Africa (16-17) (Ukoli, 1990, Cowper, 1966) Their eggs are resistant to adverse conditions of low temperature, desiccation and strong chemicals and can remain viable for several years (Cowper, 1966)

Contamination rates in different markets show that Dekina market has the highest rate of 4.50% followed by Bassa market with 3.86%. The differences in contamination of fruits and vegetables among the three markets could be attributed to poor sanitary condition and weather of the areas, although the differences were not statistically significant. The filthy environment and refuse heaps constitute means of contamination for fruits and vegetables even at the point of sale where these edible products are displayed.

CONCLUSIONS

Since both fruits and vegetables were found to be contaminated, consumers are advised to wash them thoroughly before eating or using for salad preparation.

The need to re-focus on health promotion and education on the mode of transmission of disease, environmental sanitation and personal hygiene and eating habits will enhance the prospect for the control of parasitic infections in Nigeria.

REFERENCES

- Awodi NO, Nock IH and Aken Ova I (2000).** Prevalence and Public Health Significance of Parasites Cysts and Eggs on the Nigerian Currency. *The Nigerian Journal of Parasitology* 22 137-142.
- Adeyeba OA and Essiet U (2002).** Prevalence of Helminth and Protozoal Infections among a Region Sect that Walk Barefooted in Ise in Nigeria. *Nigeria Journal of Parasitology* 5-94.
- Christian A and Christopher S (2000).** Parasites Applied Biological Chemical Sciences. *British Medical Bulletin* 2000 56(1) 193-203.
- Cowper SG (1966).** A Review of Helminthiasis in the Western Region of Nigeria with Special Reference to the Ibadan Area. *West African Journal of Medicine* 15(6) 203-209.
- Gilling S, Taylor EA, Kane K and Taylor JZ (2001).** Successful hazard analysis critical control point implementation in the United Kingdom: understanding the barriers through the use of a behavioural adherence model. *Journal of Food Protection* 64 710-715.
- James IM and Ogodukwu O (2006).** A Survey of Geohelminth Ova and Larvae on Vegetable and Fruits Sold in Onitsha Southeast Nigeria. *Journal of Environment Health* 3(1).
- Kusumaningrum HD, Asselt ED, Beumer RR and Zwitering MH (2004).** A quantitative analysis of cross-contamination of salmonella and campylobacteria species via domestic kitchen surfaces. *Journal of Applied Bacteriology* 73 115-135.
- Ukoli FMA (1990).** In Introduction to Parasitology in Tropical Africa. Test flow Ltd. Ibadan 252-266.