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Parasitic Contamination of Some Vegetables Sold In Markets in Owerri, Nigeria

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ABSTRACT: This study to determine the parasitic contamination of some selected vegetables sold in markets in Owerri, Nigeria was conducted between November to December, 2015. The samples (vegetables (120) were randomly purchased from sellers and examined for ova, cyst and larvae by sedimentation technique. Fifty percent (50%) of the entire vegetable examined were contaminated with Talinum traingulare as the most heavily contaminated of the four parasites isolated. The trophozoites of Trichomonas homonis was the most prevalent parasite, followed by trophozoites of Giardia lamblia while the cysts of Entamoeba coli and Entamoeba histolytica were also encountered. There is therefore a need for safety practice in planning, harvesting, storage and proper handling of vegetables. It is recommended that both vegetables vendors, and consumers should properly wash their vegetables to minimize parasitic contamination.

I. INTRODUCTION & OBJECTIVES

Intestinal parasitic infections are widely distributed throughout the world causing substantial intimidation to the public health, economy, and physical and cognitive development particularly among children in developing countries like Nigeria. About 3.5 billion people are infected with some kind of intestinal parasites causing diseases like Ascariasis, Ancylostomiasis, Trichuriasis etc and responsible for about 2-3 million death annually worldwide (WIPO, 2008). The poor personal hygiene, poor environmental hygiene & poor health system are the major prevalent factors among the affected populations (Wegayehu et al., 2013). These factors promote transmission of parasitic infections from host to host and from soil to host. Fecal – oral transmission through consumption of contaminated food and water also occur (Wegayehu et al., 2013).

Vegetables are part of daily diet in many households forming an important sources of vitamins, proteins and mineral requirements for human health. They also act as neutralizing agents for acidic substances formed during digestion (Thompson and Kelly, 1990).

Parasitic contamination of vegetables may take place before and after harvest (Halablab et al., 2011). The contamination before harvesting can come through soil, faeces (human and animal origin), water (irrigation, cleaning) ice, animals (including insects and birds) and application of animal manures or sewage (Amoah et al., 2009). It can also be introduced during harvesting, handling of the product, processing equipment and transportation (Johannessen et al., 2002). Accordingly, this study was designed to determined the parasitological contamination of vegetables sold in selected local markets in Owerri Metropolis. It will also create an increased awareness of the impact of parasites on the vegetable supply and make recommendation to growers,processors and consumers of vegetables.

II. MATERIALS AND METHODS

Description of Study Area: The study was conducted in Owerri Municipal which is also the capital of Imo State, Nigeria ($5^0 41^1$ - $5^0 31^1$N and $6^0 15^1$ -$7^0 34^1$E). The climatic seasons are well defined: a dry season (mid October to March) and a

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wet season (from April to early October) and vegetable are forest. It has about three major markets where locally sourced goods are sold to increasing human population. The vegetables are usually conveyed by rural farmers from the environs to the markets for high revenue due to high demands.

Study Design & Sample Collection: Vegetables were sampled from three different major markets; Ekeonunwa market, Relief Market; and Amakohia market in Owerri Metropolis. Four common vegetables eaten by the people within the Owerri were used for the study. The vegetables used were Pterocarpus mildbreadii (oha leaf), okazi/afang "Gnetum africanum, pumpkin leaf Cucurbita species and water leaf "Talinum Traingulare". The four vegetables were chosen because they are major vegetables consumed by the residents of Owerri. A total of 30 samples for each of the vegetable were selected.

III. SAMPLE ANALYSIS

Macroscopical Examination: Each of the samples was examined carefully for the presence of segment of cestodes and adult nematodes.

Microscopical Examination:
A portion (50g) of each vegetable was washed separately in 200ml of normal saline for parasitic detachment. After overnight sedimentation of the washing solution, 15ml of the sediment was then transferred to a centrifuge tube using sieve to remove undesirable matter. The tube was centrifuged at 3000rpm for five minutes and part of the sediment was examined using X10 and X40 objective. Also part of the sediment was suspended in magnesium sulphate floatation fluid of specific gravity 1.3. The floatation was filled to the brim and a covership was superimposed, the covership was lifted and examined under a light microscope. The cysts and eggs of various parasite species present were identified (Suzuki, 1981). Each parasite eggs, larvae or cysts present in the samples were counted.

IV. RESULTS

In all the three markets from which the survey was carried out, only 60 out of the 120 samples which were about 50.0% had parasites as indicated in Table 6. From Relief market, one of the sample locations, water leaf (Talinum traingulare) had the trophozoite of Trichomonas hominus as the most prevalent organism, followed by Okazi leaf (Gnetum africanum) with trophozoite of Giardia lamblia as shown in table 3. In Amakohia market, water leaf (Talinum traingulare) had the highest parasitic load with trophozoite of Trichomonas hominus as the most prevalent parasites as presented on Table 1. In Douglas market, Okazi leaf (Gnetum africanum) has the highest load of intestinal parasites with trophozite of Trichomonas hominus as the most prevalent organism followed by oha leaf (Ptercarpus mildbreadii) with both trophozoites of Gardia lamblia and Trichomonas hominus. The Relief Market presented the highest number of parasites found in all the three markets as shown on table 4. Table 5 revealed that water leaf (Talinum traingulare) was the most contaminated with intestinal parasites while the least affected was pumpkin leaf (curcubital species). The most prevalent parasite was shown to be trophozoite of trichomonas hominus as presented in table 6.

Table 1: Showing the types of parasites on vegetables in Amakohia Market

Vegetable Botanical Name	Family Common Name	Local Name	Types of Parasites	Number of Parasites
Ptercarpus mildbreadill	Oha leaf	Oha leaf	Cyst of Entamoeba coli	1
Talinum traingulare	Water leaf		Trophozoite of Trichomonas hominus	2
Gnetum africanum	Okazi leaf	Afang leaf	Cyst of Entamoeba coli	1
Curcubital species	Pumpkin leaf	Ugu	Trophozoite of Trochomonas hominus	1

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Table 2. Showing the types of parasites on vegetables in Douglas Market

Vegetable Botanical Name	Family Common Name	Local Name	Types of Parasites	Number of Parasites
Ptercarpus mildbreadill	Oha leaf	Oha leaf	Trophozites of Gardia lamblia trophozoites of Trichimonas hominus	2 3
Talinum traingulare	Water leaf		Cyst of Entamoeba coli	1
Gnetum africanum	Okazi leaf	Afang leaf	Trophozoites of Trichomonas hominus	8
Curcubitol Species	Pumpkin leaf	Ugu	Trophozoise of Giandia Lamblia	2

Table 3: Showing the types of parasites on vegetable at Relief Market Owerri

Vegetable Botanical Name	Family Common Name	Local Name	Types of Parasites	Number of Parasites
Ptercarpus mildbreadill	Oha leaf	Oha leaf	Cyst of Entamoeba coli	2
Talinum traingulare	Water leaf		Trophozoites of Trichimonas hominus Cyst of Entamoeba coli	25 2
Gnetum africanum	Okazi leaf	Afang leaf	Trophozites of Gardia lamblia	10
Curcubital species	Pumpkin leaf	Ugu	Cyst of Entamoeba histolytica	2

Table 4: Comparative load of parasites on vegetables in all the three Market

Vegetable Botanical Name	Family Common Name	Local Name	Amakohia Market	Douglas Market	Relief Market
Ptercarpus mildbreadill	Oha leaf	Oha leaf	1 (20.0%)	5 (31.25%)	2 (4.76%)
Talinum traingulare	Water leaf		2 (40.0%)	1 (6.25%)	28 (66.67%)
Gnetum africanum	Okazi leaf	Afang leaf	1 (20.0%)	8 (50.0%)	10 (23.81%)
Curcubital species	Pumpkin leaf	Ugu	1 (20.0%)	1 (12.50%)	2 (4.76%)
			5	**16**	**42**

Table 5: Comparative load of parasites on each of vegetables in all the three Market

Vegetable Botanical Name	Family Common Name	Local Name	Amakohia Market	Douglas Market	Relief Market	Total
Ptercarpus mildbreadill	Oha leaf	Oha leaf	1 (12.5%)	5 (62.5%)	2 (25.0%)	8
Talinum traingulare	Water leaf		2 (6.5%)	1 (3.2%)	28 (90.3%)	31
Gnetum africanum	Okazi leaf	Afang leaf	1 (5.3%)	8 (42.1%)	10 (52.6%)	19
Curcubital species	Pumpkin leaf	Ugu	1 (20.0%)	1 (40.0%)	2 (40.0%)	5

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Table 6: Prevalence of parasites found in all the three markets

Parasites	Total number of parasites
Cyst of Entamoeba coli	7 (11.7%)
Trophozoite of Tichomonas hominus	39 (65.0%)
Trophozoite of Giardia lamblia	12 (20.0%)
Cyst of Entamoeba histolytica	2 (3.3%)
Total	**60**

V. DISCUSSION

The detection of intestinal parasitic stages from vegetables is an indicative of the fecal contamination from human and animal origins. As in many tropical countries, intestinal parasites are widely distributed in Nigeria not only due to the favourable climatic conditions for the survival and dissemination of the parasites but also due to the unsanitary conditions that facilitate fecal pollution of water, food stuffs and soil (Omowaye and Audu, 2012).

Out of the 120 samples of vegetables examined only 60 (50.0%) were positive for intestinal parasites, this shows that one in every two samples vegetables was contaminated, it is however greater indication that much care should be taken in handling vegetable before consumption to prevent the deleterious harmful effect to human health.

Four (4) different types of intestinal parasites were isolated. The prevalence of the parasites is in the following order, Trichomonas hominus (65%), Giardia lamblia (20.0%), Entamoeba coli (11.7%) and Entamoeba histolytica (3.3%) (Table 6). Out of these only Entamoeba coli and Trichomonas hominus are present in all the three markets.

A recently recognized E. coli strain was reported to produce high levels of toxins that can cause kidney damage as well as septicaemia or blood poisoning. The symptoms can include diarrhea, chills, headaches and high fever and in some cases the infection can lead to death even with medical intervention (Saritha, 2015).

However, Giardia lamblia is a unicellular eukaryotic protozoa, belonging to the phylum sacromastigophora, they are obligate parasite responsible for the disease Giardiasis in human (Cheesbrough, 2009).

Giardiasis is prevalent worldwide and moreso in tropical and subtropical countries. It colonies the upper portions of the small intestine. Infections with these parasites are more common where sanitation is poor and raw human feaces are used as fertilizer. The symptoms of Giardiasis include Anemia, malabsorption, constipation, diarrhea, nausea and vomiting.

In Jos, Trichomonas hominus was found to be the most prevalent (Idahosa et al., 2011) which is similar to our findings.

A previous study carried out by (Eni et al., 2010) demonstrated highest rate of contamination, 4.52 % for Giardia lamblia parasite in the area.

In Ebonyi, only Ascaris lumbricoides, hookworm and Trichuris trichura were isolated with Ascaris lumbricoides as the most prevalent (Uneke, 2004).

The prevention of contamination remains the most effective way of reducing food borne parasitic infection. A comprehensive health education should be given to vendors and farmers of vegetables and to the general population on the health risks associated with consumption of contaminated vegetables.Farmers should ensure that vegetable are grown hygienically, the use of sewage or waste water with potential risks of transmitting infections pathogens should be discouraged. The vendors of vegetables should avoid the contact of the produces with soil while display for selling. The vendors and consumers should endeavour to wash all products thoroughly in clean chlorinated water before selling

VI. CONCLUSIONS

Freshly eaten vegetables should be considered a potential risk for contracting parasites,particularly protozoa in Owerri lmo state. Fifty percent (50%) of the entire vegetable examined were contaminated with Talinum traingulare as the most heavily contaminated of the four parasites isolated. There is therefore a need for safety practice in planning, harvesting, storage and proper handling of vegetables.

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CONTRIBUTION OF AUTHORS

Generally,all the authors participated in the mental activities of the work.But specific contributions of the authors are stated below;

Amah Henry(Laboratory analysis of samples) ,
Agu Emelda(Collection and processing of samples),
Uduji Helen(Laboratory analysis of samples)' Nsonwu Magnus(Statistical analysis of data)
Anikwo Emeka(Collection and processing of samples)
Amah Catherine(Statistical analysis of data)
Eberechi Nwanguma(Gathering of literature materials for the work and the write-ups.)
Ogbachalu Okwudili(Gathering of literature materials for the work and the write-ups.)
Uche Uchegbu(Gathering of literature materials for the work and the write-ups.)