

AN INDISCRIMINATE DEFAECATION AND DISPOSAL OF FAECAL MATERIAL MAKE PERI-URBAN CULTIVATED CROPS POTENTIALS FOR PARASITE TRANSMISSION AND EXPOSE PARASITES TO COMMUNITY

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ABSTRACT

The risk factors of contracting Neglected Tropical Diseases are becoming increasingly high in both rural and urban settlements. Faecal contamination of food is another form of faecal - oral transmission. Opened space defaecation is commonplace in rural settlement while indiscriminate disposal of faecal material is common in urban settlements. The business of faecal material disposal is flourishing in urban areas and the stake holders are not aware of risk factors and they lack proper site for the faecal waste disposal. As a result, parasites are exposed to community. A study was conducted at Nomansland, a Peri-urban settlement in Kano metropolis, Nigeria. Over a period of four months, vegetables were examined for parasites and *Ancylostoma duodenale*, *Ascaris lumbricoides*, *Entamoeba histolytica*, *Fasciola hepatica*, *Giardia lamblia*, *Necator*

Introduction:

Peri-urban vegetable cultivation dates back some hundred years ago and has been assisted by favourable environmental condition, readily available market and adequate water supply. The practice had contributed immensely in regular supply of vegetables that are mostly marketed and consumed within the city and its environs [9]. Most of the available lands by the side of streams that flow through cities are used for irrigation of vegetables, fruits and other high valued crops for consumption of city dwellers. Rivers and streams that flow through cities are badly kept with their banks as disposal sites for municipal wastes, as space for indiscriminate

americanus, Schistosoma haematobium, and Strongyloides stercoralis were observed. Demonstration and implications of F-diagram (faeces, fingers, flies, fields, fluids, feed) should be addressed to members of the community. This study was restricted to parasitic examination. Bacterial, fungal and viral examinations are recommended.

Keywords: Community, Defaecation, Faecal, *Giardia lamblia*, *Strongyloides stercoralis*

Defaecation and public sewage system draining into them [2]. Using waste water and night soil as manure for irrigation, therefore, pose the greatest threat to the safe agricultural practices and disease potentials [2]. There is no barrier between the vegetables cultivated and waste water, disposed wastes, faeces, etc. Therefore, the vegetables may be potentials for parasites and other disease transmissions. Parasites have been associated with vegetables and fruit borne outbreaks, fruits and vegetables particularly those eaten raw without peeling have been demonstrated to be vehicles for the transmission of a range of parasites [8].

Vegetables get contaminated with microorganisms while growing in the field, during harvesting, post harvesting handling, processing and distribution [8]. On the other hand, this paper seeks to identify peri-urban cultivated vegetables as potentials for parasites transmission as their consumption is becoming higher so also parasitic infestations and this would help policy makers to devise suitable means for food safety, policies and legislations.

Materials and Methods

Study Area

The study was conducted at Nomansland, a densely populated settlement along Jakara River that flows through Kano metropolis. The area is situated at 11° 59'N, 08° 28'E. It is about 840Km from the edge of the Sahara desert and mostly within the Sudan savannah zone. The minimum and maximum temperatures range between 15°C and 33°C. Rainfall ranges from 500mm

to 1200mm and starts from May and ends in October while dry season starts in November and ends in April. The area is inhabited by Hausas, Igbos, Yorubas, Nupes, Igalas, Idomas, and other ethnic groups [7].

Choice of the Study Area

Peri-urban cultivation is practiced throughout the year in which substantial vegetables production on both banks of Jakara River takes place. The water of Jakara River is substituted by domestic and industrial wastewater. The soil of this area is sandy, moist with decaying vegetation and contaminated with human excreta resulting from indiscriminate defecation and faecal disposal. And all these form the basis for parasitic cycles.

Vegetable Sampling

Five vegetables (cabbage, carrot, lettuce, onion and tomatoes) were picked throughout the farmlands and their choice was to the fact that they are mostly consumed fresh. The collection was at maturity stage when the vegetables are ready for human consumption.

Sample Analysis and Identification of parasites

The samples were analyzed in two stages: (1) concentration stage according to [3] and (2) identification stage according to the keys of [10] for parasites identification. Using weighing machine, 25g of vegetables were weighted and soaked into a beaker containing 250mls of sterile distilled water. This was followed by centrifuging at 500rpm for 15minutes. The concentrated sediment at the bottom of the beaker was withdrawn using rubber pipette and mixed with Lugol's iodine on a sterile microscope slide. The parasite or their cysts, ova or larva were identified microscopically.

Results

The results of study on peri-urban cultivated vegetables as potentials for parasite transmission are presented in table below. Eight parasites were found associated with the five vegetables examined and namely, *Ascaris*

lumbricoides, *Ancylostoma duodenale*, *Necator americanus*, *Strongyloides stercoralis*, *Schistosoma haematobium*, *Fasciola hepatica*, *Giardia lamblia*, and *Entamoeba histolytica*. Even though no adult parasite is found associating with the vegetable but their infective stage (eggs, larvae, cercaria and metacercaria) were observed. The parasites were collectively found to fall under three categories, viz: nematodes, flukes and protozoa. *Giardia lamblia*, *E. histolytica* and *S. haematobium* were found common to all vegetables. *Fasciola hepatica* was the least and was found associating with lettuce only. Carrot, lettuce and onion were found to accommodate most the parasites while cabbage and tomato accommodated the least.

Table 1: Peri-urban cultivated vegetables and associated parasites.

Parasites	Infective stage observed	Classification	Vegetables				
			Cabbage	Carrot	Lettuce	Onion	Tomato
<i>Ascaris lumbricoides</i>	Eggs	Nematode	-	+	-	+	+
<i>Ancylostoma duodenale</i>	Larvae	Nematode	-	+	+	+	-
<i>Necator americanus</i>	Larvae	Nematode	+	-	-	+	-
<i>Strongyloides stercoralis</i>	Larvae	Nematode	-	+	+	-	-
<i>Schistosoma haematobium</i>	Cercaria	Fluke	+	+	+	+	+
<i>Fasciola hepatica</i>	Metacercaria	Fluke	-	-	+	-	-
<i>Giardia lamblia</i>	Cyst	Protozoa	+	+	+	+	+
<i>Entamoeba histolytica</i>	Cyst	Protozoa	+	+	+	+	+

Legend: + = Associated with - = Not associated

Discussion

The number of parasites contaminating the vegetables is very high. Vegetables get contaminated with micro-organisms while growing in the field and the high incidence of helminthes isolated could be due to the frequency of contact with soil containing the eggs of the parasites. Use of improperly formed compost manure and water containing fecal materials lead to parasitic transmission[6]. Physical observation on the study area revealed the habit of use of night soil as manure. These attitudes may be responsible for the parasites abundance observed.

The six vegetables examined were found to be contaminated with some or almost all the parasites. For example, lettuce was found to be contaminated with all the parasites with exception of *A. lumbricoides* and *N. americanus* so also carrot has a similar level of contamination. The association between the vegetables and the parasites may not only be due to the soil and manure engaged in the practice but also the water used as indicated by Almost half of the world-population is affected by water-borne and food-borne infections. Parasitic food-borne and water zoonosis contributes to the infection of a heavy toll on human health [4].

Studies have shown that the river system is highly contaminated with both organic and inorganic pollutants and during the dry season, flow of Jakara-Getsi river system is almost entirely made up of sewage and industrial wastewater entering the irrigation channel [1],[5]. This showed that the method of irrigation can influence how effectively pathogens present in irrigation water are transmitted.

Except in few cases all the vegetables examined in this study are consumed raw. The consumption of raw or uncooked vegetables facilitates transmission of large number of infection especially helminthes. Most of helminthes infections from vegetables consumption are the causes of mortality rate among humans.

Conclusion

This study had proved peri-urban cultivated vegetables as potentials for parasites transmission as it revealed eight parasites of different group contaminating five vegetables examined. It was observed that the contamination was due to the method of cultivation employed, which involve the use of waste-water, use of human excreta as fertilizer (night soil) and indiscriminate defecation on the farmland.

Recommendations

There is need to avoid the use of waste-water for agricultural activities and as well as the use of human excreta as fertilizer. Indiscriminate defecation on the farmland should be avoided. There is also need to avoid consumption of raw vegetables until they are washed.

References

- Bichi, M. H. (1993); Environmental pollution in Kano in the contribution of waste-water discharges from Bompai, Sharada and Challawa Industrial Estate. *Preceeding of Scientific Association of Nigeria, 1993, Bayero University, Kano.*
- Binns, T., Maconachie, R. A. and Tanko. I. A. (2003). Water, Land and Health in Urban and Peri-urban Food production: the case study of Kano, Nigeria. *Land Degradation and Development* 14(5): 431 - 444.
- Bitton, G., Mendil, A. and Habbari, K. (1999). Helminthic infection association with the use of raw waste-water for Agricultural Purposes in Benin Mellai, Morocco. *East Medical Health Journal*, 5(5): 912 - 921.
- Geerts, S., Gottstein, B. and MacPherson, C. N. (2000). Parasitic food-borne and water zoonosis. *Rev-Sci-Tech*. 19(1): 240 - 258.
- Imam, T. S. (2010). Aspects of Ecology and Biomonitoring of Heavy Metals Associated with Industrial Pollution in the Bompai-Jakara Catchment Basin, Kano state, Nigeria. *Ph.D Progress Seminar Bayero University, Kano (Unpublished).*
- Mara, D. D., Ayre, R. M., Scott, R. and Silva, S. A. (1996). Contamination of lettuce with Nematode eggs by spray irrigation with treated and untreated waste-water. *Water Science and Technology* 26: 1615 - 1623.
- Pagenation.com/world/Kano12/3/2012: Local Distances between urban and rural areas of Kano State, Nigeria.
- Splittstoesser, D. F. and Brackett, R. E (1992). *Fruits and vegetables in compendium of methods of microbiological examination of food*. APHA, Washington D.C. Pp 919 - 927.
- Umar, A. A. and Sadau, M. A. (2000). Incidence of pests of different vegetables crops grown in the peri-urban farms along Jakara river, Kano, Nigeria (unpublished).
- World Health Organization (1993). *Basic Laboratory Methods in Medical Parasitology*, Geneva, [Http://www.who.int/whr](http://www.who.int/whr).