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PREVALENCE OF INTESTINAL PARASITES ON MARKET SOLD FRUITS AND VEGETABLES

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ABSTRACT

Prevalence of intestinal parasites on fruits and vegetations sold in Bauchi North, Bauchi State, Nigeria was studiedfrom September to November, 2018. The study was to determine the prevalence and type of parasites on fruits and vegetables sold in the area. Four different fruits and vegetables were purchased from the main markets of the three selected Local Governments (Katagum, Jama'are and Shira) once in a week.A total of 288 samples, comprising of 144 fruits (watermelons, oranges, pineapples and Bananas) and 144 vegetables (cabbages, lettuces, onions and tomatoes) were purchased and examined for intestinal parasites using sedimentation method.Intestinal parasites were detected on 29(20.1%) fruits and 17(11.8%) vegetables.*Entamoeba histolytica*11(37.9%) and *Ascaris lumbricoide*7(41.2%)were the most prevalence parasites on the fruits and vegetables samples respectively.Poor environmental sanitation and preservation techniques by vendors, farmers and consumers were discovered to play a key role in contamination of the fruits and vegetables in the area. Contaminations of fruits and vegetables by intestinal parasites can be reduced or prevented through proper disposal of human and animal waste, washing of fruits and vegetables as well as educating vendors of food safety practice.

Keyword: Intestinal parasites, Fruits, Vegetables, Bauchi

INTRODUCTION

Fruits and vegetables are important component of a healthy diet, and often contain a number of essential vitamins and minerals, carbohydrates, dietary fiber and phyto-chemicals that individually, or in combination demonstrate considerable antioxidant activity of important health benefit (Liu, 2003; Syngletary*et al.,* 2005; Percival *et al.,* 2006; Davidson *et al.,* 2009; Zhang *et al.,*2009; Oranusi and Braide, 2012). Regular consumption of fruits and vegetables has been reported to reduce the risk of cardiovascular disease (especially coronary heart disease), cancer, stroke, cataracts and some of thefunctional declines associated with aging (Rui, 2003). Base on this, medical practitioners and health educators regularly advised/encouraged

people to used fruits and vegetables on their daily nourishment.Raw of these fruits and vegetables are regularly consumed. The consumption of raw vegetables and fruits plays a major epidemiological role in the transmission of parasitic diseases (Abougrain*et al.*, 2010).

There are several ways in which fruits and vegetables can be contaminated, some of these become contaminated while still attached to the plant on the field due to untreated manure. Others become contaminated during harvesting, transportation, processing, distribution and marketing or even at home before consumption (Malann and Utitofon2016). Roberts, (2009) reported that, there was a strong association between vegetables and fruits especially the raw ones and parasitic infection. This study is aimed at determining the prevalence and type of parasites on fruits and vegetables sold in the study area.

MATERIALS AND METHODS

Study Area

The study was conducted in Bauchi North, Nigeria. Seven (7) Local Governments make up the North, out of the twenty Local Government of the Statewhich includes Katagum, Shira, Jama'are, Itas/ Gadau, Zaki, Gamawa and Giade. Bauchi North occupies a total land of 9717km representing about 20.2% of the State's total land area. According to the NPC (2006) census, the North has a total population of 1512677. In addition to rainfall, it has a many water bodies which give the opportunity for irrigation farming in the area. Most of these vegetables were planting in the area and some of the fruits.

Sample Collection

The samples were collected once in a weekfrom September to November, 2018. A total number of 288 samples, comprising of 144 fruits (watermelons, oranges, pineapples and Bananas) and 144 vegetables (cabbages, lettuces, onions and tomatoes) were randomly purchased from the main market of the three selected Local Governments (Katagum, Jama'are and Shira).Each sample from each Local Government was labeled and transported in separate sterile polythene bags to the laboratory for parasitological examinations

Parasitological Examinations

Each sample was washed using 20ml of distilled water in a plastic container. The washed water was strained using a sterile sieve to remove any unwanted materials. The filtrates were poured into a test tube and centrifuged at 3000rmp for five minutes (Damen*et al.,*2007). The supernatants were discarded, and the remaining sediments were mixed. Adrop of sediment was placed on the center of a clean greasefree slide usingdropper. One drop of iodine was added and a clean cover slip was placed gently to avoid air bubbles and over-flooding. The prepared slides were examined under compound microscope for identifications of parasitesat magnification X10 and X40 as described by Cheesbrough (2004). The recovered ova and cysts were identified based on their morphological characteristics

with reference to the standard keys (Cheesbrough, 2006).

Data Analysis

The result obtained were analyzed using chi-square for any significant differences on the prevalence of intestinal parasites on fruits and vegetables at P<0.05 level of significance, and simple percentage was used to represent the results obtained.

RESULTS

Out of the 144 fruits and 144 vegetables examined, 29(20.1%) fruits and 17(11.8%) vegetable were infected with various type intestinal parasites. However, there was significant difference (p> 8.07 and 5.0) in prevalence rate on the fruits and vegetables respectively as shown in table 1.

Table 1: Showing prevalence of intestinal parasite on fruits and vegetables in the study area

S/N	Fruits	No. examined	No. infected (%)	Vegetables	No examined	No. infected (%)
1	Water lemon	36	12(33.3)	Cabbage	36	7(19.4)
2	Orange	36	4(11.1)	Lettuce	36	4(11.1)
3	Pineapple	36	9(25)	Onions	36	1(2.8)
4	Banana	36	4(11.1)	Tomatoes	36	5(13.9)
	Total	**144**	**29(20.1)**		**144**	**17(11.8)**
	X^2 calculated = 8.07; X^2 tabulated =7.82 , df= 3, P>0.05			X^2 calculated = 5.0; X^2 tabulated = 7.82, df= 3, P>0.05		

The total number of fruits and vegetables examined in the selected Local Governments, KatagumLocal Government had the least number of infected fruits and vegetables 12(11%) when compare with the other selected twoLocal Governments that both had 17(15.7%). However, there was no significant difference (p>0.05) in prevalence rate different Local Government on fruits and vegetables, as shown in the table 2 below.

Table 2: Prevalence of intestinal parasite on selected areas on fruits and vegetables

	Fruits		Vegetables		
Local Government Area	**Number examined**	**Number infected (%)**	**Number examined**	**Number infected (%)**	**Total (%)**
Katagum	48	8(16.6)	48	4(8.3)	12(11)
Shira	48	10(20.8)	48	7(14.6)	17(15.7)
Jama'are	48	11(22.9)	48	6(12.5)	17(15.7)
Total	144	**29(20.1)**	**144**	**17(11.8)**	**46(16)**
	X^2 calculated = 0.07; X^2 tabulated =5.99 , df= 2, P>0.05		X^2 calculated = 0.07; X^2 tabulated = 5.99, df= 2, P>0.05		

Table 3 Shows the various type of parasite encountered on each sample examined on both the fruits and vegetables during the studies**.** The result reveals that water melon has the highest prevalence 33.3% of intestinal parasites follow by pineapple with 25% and onion had the lowest prevalence of 8.3%. Other such as orange, banana, tomatoes, cabbage has 11.4% while lettuce has 167%.

Table 3: Shows the various type of parasite encountered on both the fruits and vegetable in the study area.

S/N	Samples	No. examined	Parasites observed		No of parasites (%)
1	Watermelon	36	*Entomeoba histolytica*	4	12(33.3)
			Ascaris lumbricoides	4	
			Strongyloidesstercoralis	2	
			Hookworm	2	
2	Orange	36	*Entomeoba histolytica*	1	4(11.1)
			Ascaris lumbricoides	1	
			Ancylostoma duodenale	1	
			Taenia spp.	1	
3	Pineapple	36	*Entamoeba histolytica*	4	9(25)
			Ascaris lumbricoides	2	
			strongyloide stercoralis	1	
			Hookworm	1	
			Hymenolepis nana	1	
4	Banana	36	*Entomoeba histolytica*	2	4(11.1)
			Ascaris lumbricoides	1	
			Giardia lamblia	1	
5	Cabbage	36	*Ascaris lumbricoides*	1	4(11.1)
			Ancylostoma duodenale	1	
			Entamoeba coli	2	
6	Lettuce	36	*Ascaris lumbricoides*	3	6(16.7)
			Ancylostoma duodenale	1	
			Entamoeba coli	2	
7	Onion	36	*Ascaris lumbricoides*	1	3(8.3)
			Strongyloides stercoralis	1	
			Taenia spp.	1	
8	Tomato	36	*Ascaris lumbricoides*	2	4(11.1)
			Ancylostoma duodenale	1	
			Giardialamblia	1	
	Total	288			46(16)

During the study different type of intestinal parasite were encountered with *Ascaris lumbricoides* 32.6% has the highest prevalence fellow by *Entomeoba histolytica, Entamoeba coli, Strongyloidesstercoralis* and *Ancylostoma duodenale*,

Hookworm,*Giardia lamblia* and *Taenia* spp and *Hymenolepis nana* with 23.9%, 8.7%, 6.5,4.3% and 2.2% respectively as shown in table 4

Table 4: Show the prevalence of each of the parasite encountered during the study

S/N	Parasite	Prevalence (%)
1	*Entomeoba histolytica*	**11(23.9)**
2	*Entamoeba coli*	**4(8.7)**
3	*Strongyloidesstercoralis*	**4(8.7)**
4	*Hookworm*	**3(6.5)**
5	*Hymenolepis nana*	**1(2.2)**
6	*Giardia lamblia*	**2(4.3)**
7	*Taenia* spp	**2(4.3)**
8	*Ascaris lumbricoides*	**15(32.6)**
9	*Ancylostoma duodenale*	**4(8.7)**
Total	**288**	**46(16)**

DISCUSSION

Infections with parasites present a major public health problem in poor and developing countries and have constituted global health as well as economic threat, which does not only depend on regional or ecological conditions, but also on the development of the people Ukpai and Ugwu, 2003. However, fruits and vegetables have been reported to contribute frequently in the transmission of different helminth and protozoan throughout the world.

The present study tried to determine the prevalence and type of intestinal parasites found on some fruits and vegetables sold in Bauchi North senatorial, Bauchi State Nigeria. A total number of 288 (144 each) fruits and vegetables were examined, out of which 29(20.1%) fruits and 17(11.8%) vegetables were positive with different type of intestinal parasite. The result of this study differs with the earlier study made by Istifanus and Panda (2018) in Bauchi metropolis who reported 14.3% on fruits and 13.8%on vegetables. The different in the prevalence rate may be due to the locations and more awareness in the urban areas than the rural areas. Also, it maybe attributes to the type of farming system and availability of more farming facilities such as fertilizer.

In general, the present study revealed low prevalence 16% of intestinal parasite on fruits and vegetables sold in the study area when compare with other study in different part of the world such as Malann and Utitofon (2016)in Gwagwalada area council and Gupta *et al.* (2009) in India who reported 42% and 44.2% respectively. These fruits and vegetables mostly were farming using irrigation system of farming. There are some documents in different parts of the world that reported the use of untreated wastewater as the major causes of parasitic contamination of vegetables (Al-Binali*et al.,* 2006; Kozan*et al.,* 2005; Shafa-ul-Haq*etal.,* 2014). This may be the reason for low prevalence of the intestinal parasite in the area. Treated water or water directly from the wells is usually used in this type of faming system in the study area.

Entamoeba histolytica 11(37.9%) and *Ascaris lumbricoide*7(41.2%) were the most prevalence parasites on fruit and vegetable samples respectively. The high prevalence of *Ascaris lumbricoide* inthis study is in consistent with the similar studies made by Uneke (2007), Malann and Soso, (2012),Malann and Utitofon (2016) in different part of Nigeria. Other parasite encountered were *Entamoeba coli,*

Strongyloidesstercoralis and *Ancylostoma duodenale*, Hookworm*, Giardia lamblia and Taenia* spp and Hymenolepis *nana*. All these parasites were similarly reported by different researcher in the different part of the country such as Malann and Utitofon (2016) in Gwagwalada area councilAbuja, Alli *et al*. (2011) in Ibadan marketwith variation on the prevalence rate. Different factors may be responsible for this variation such as method used in the detection of the parasite, number and type of sample examined, type of water and fertilizer used for the irrigation farming, preservation techniques by farmer and vendors as well as geographical location among others.

CONCLUSION

There is prevalence of intestinal parasite on fruits and vegetables sold in the study area. Poor environmental sanitation and preservation techniques by vendors, farmers and consumers as well as type of fertilizer and water used were discovered to play a key role in contamination of fruits and vegetables in the area. Despite the low prevalence of the intestinal parasite on fruits and vegetables sold in the study area, the following recommendations were made to avoid further escalation; Farmers and consumers should be educated on good hygiene farming and consumption of fruits and vegetables.

REFERENCE

Abougrain, A., Nahaisi, M., Nuri, M., Mohamed, S. and Khaila, S. (2010). Prevalence of intestinal parasites in fresh salad vegetables from wholesale and retail markets in Tripoli, *Libya. J. Homepage Food Cont*. 11:5-14.

Adel T. A. (2015). The Prevalence of Parasitic Contamination on Common Sold Vegetables in Alqalamoun Region. *Int. J. Pharm. Sci. Rev. Res*., 30(1) 18: 94-97.

Al-Binali A.M., Bello C.S., El-Shawi K. and Abdallah S.E. (2006). The prevalence of parasites in commonly used leafy vegetables in south western Saudi Arabia. *Saudi Arabian MedicalJournal*.27: 613-616.

Alli, J. A., Abolade, G. O., Kolade, A. F., Solako, A. O., Mgbakor, C. J., gundele, M. T., Oyewo, A. J. and Agboula, M. O. (2011). Prevalence of intestinal parasites on fruits available in Ibadan markets, Oyo State, Nigeria. *Acta Parasitological Globalis.* 2 (1): 6-10.

Cheesbrough M. (2004). *District Laboratory Practice in TropicalCountries Part I*. Cambridge University press, United Kingdom: 178-209.

Cheesbrough M. (2006). *District medical laboratory practice in tropical countries*. 2nd Edition. Cambridge University Press, UK.

Damen, J. G., Banwat, E. B., Egah, D. Z. and Allamana, J. A. (2007). Parasitic Contamination of vegetables in Jos, Nigeria. *Annals of African Medicine*, 6 (3): 115-118.

Davidson P.G. and Touger-Decker, R. (2009). Chemopreventive role of fruits and vegetables in oropharyngeal cancer. *Nutrition clinical Practice*.24(2):250-260.

Gupta N., Kahn D.K., andSantra S.C. (2009). Prevalence of intestinal helminth eggs on vegetables grown in waste water-irrigated areas of Titagarh, Benghad, India. *Food Control*. 20: 942-945.

Istifanus, W.A and Panda, S.M. (2018). Parasitic Agents in Fresh Fruits and Vegetables Sold in Open Markets in Bauchi, Nigeria. *Journal of Food Quality and Hazards Control.*5:*84-88.*

Kozan, E., Gonenc B., Sarimehmetoglu O. and Aycicek H. (2005). Prevalence of helminth eggs on raw vegetables used for salad. *Food Control*. 16: 239-242.

Liu, R.H. (2003). Health Benefit of fruit and vegetables are from additive and synergistic combinations of phytochermicals. *Am. J. Clin. Nutr*.,78: 5175-5205.

Malann, Y. D. and Soso, A. H. (2009). The Prevalence of Parasitic Infestation on commonlysoldvegetables in Gwagwalada Market,F.C.T, Abuja. *International Journal of Basic and Applied Sciences*, 1 (2): 163-165.

Malann, Y.D. and Utitofon, I.T. (2016). The Prevalence of Intestinal Parasites on Fruits Sold in Markets Around Gwagwalada Area Council,F.C.T, Abuja. *AASCIT Communications.*3(2):107-111.

Oranusi U.S. and Braide W. (2012). Microbiological safety assessment of Apple fruits (*Malus domestica*Borkh) sold in OwerriImo State Nigeria. *Adv. J. Food Sci. Technol*. 4(2): 97-102.

Percival, S.S., Talcott, S.T., Chin, S.T., Mallak, A.C., Lound-Singheton, A. andPettitmoore, J. (2006). Neoplastic transformation of BALB/3T3 cells circle of HL-60 cell are inhibited by mango(*mangiferaindica*L) Juiceand Mango Juice extract. *J. Nutrit*. 136:1300-1304.

Roberts, S., John, J., and Gerald, D. (2009). *Foundation of Parasitology*; 8th.edition. New York.18.

Rui, H. L. (2003). Health Benefits of Fruit and Vegetables are from Additive and Synergistic Combinations of Phytochemicals. *American J. Clin. Nutr.* 78: 517-519.

Shafa-ul-Haq S., Maqbool A., Javed K.U., Yasmin G. and Sultana R. (2014). Parasitic contamination of vegetables eaten raw in Lahore, Pakistan. *Pakistan Journal of Zoology*. 46: 130-135.

Syngletary,K,W., Jackson, S.J. and Milner, J.A. (2005*). Non-nutritive component in foods as modifiers of the cancer process in: the comprehensive Guide for Health professionals,* 3rd edition. Totowa, NJ: Humana press.

Ukpai, O.M and Ugwu, C.O. (2003). The prevalence of gastrointestinal tract parasites in primary school children in Ikwuano Local Government Area of Abia State, Nigeria. *Nigerian Journal of Parasitology*.240:129-136.

Uneke, C.J. (2007). Potential for geohelminth parasite transmission by raw fruits and vegetables in Nigeria: implication for a risk profile. *Journal*

of Nutrition and Environmental Medicine. 16:59-68.

Zhang, C.X., Ho, S.C., Chen, Y.M., Fu, J.H., Cheng, S.Z. and Lin, F.Y. (2009). "Greater vegetable and fruit intake is associated with a lower risk of breast cancer among Chinese women". *Int. J. of Cancer*. 125 (1): 181–188.