FUDMA Journal of Sciences (FJS)
ISSN online: 2616-1370
ISSN print: 2645 - 2944
Vol. 4 No. 3, September, 2020, pp 328 – 332
DOI: https://doi.org/10.33003/fjs-2020-0403-398

PARASITIC EGGS, CYSTS AND LARVAE OF SOME FRUITS SOLD AROUND DUTSIN-MA METROPOLIS, KATSINA STATE, NIGERIA

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ABSTRACT

Several parasitic infections are associated with poor personal hygiene and environmental sanitation resulting in fruits containing eggs, cysts or larva of parasites. A survey of some fruits sold around Dutsin-ma metropolis in Katsina was carried out to identify the eggs, cyst and larva present on them. A total of 180 fruit pieces were examined using standard wet mount procedure and Kinyoun acid fast stain to detect presence of parasites. The percentage of fruits found with eggs, cysts or larvae of six parasites identified were eggs of hookworm (16.42%), *Ascaris lumbricoides* eggs (24.30%), *Trichuris trichuira* eggs (8.62%), *Strongyloides stercoralis* larvae (6.64%), immature cyst of *Entamoeba histolytica* (31.62%) and eggs of *Taenia species* (12.4%) respectively. Garden eggs had the highest percentage with parasites' ova, cysts or larva (60.3%) followed by water melon (21.4%) and cucumber (12.12%), mangoes (10%), carrots (4.8%) and oranges (0%). The chi-square test showed significant ($p<0.05$) differences in number of fruits with parasitic infection. It is very important to encourage proper washing of fresh and raw fruits before they are sold or eaten which will thereby prevent transmission either at point of sell or consumption of fruits which infect via the oral route.

Keywords: Parasitic, Eggs, Cysts, Larvae, Fruits.

INTRODUCTION

Fruits are a part of diet for man and an important component of a healthy diet because they contain essential vitamins necessary for growth and body nourishment (Carey *et* al 1996). Raw fruits are known to be the major source for transmission of soil-transmitted helminthiasis (STH) when consumed without proper washing (Uneke, 2007). Intestinal parasitic infection is becoming an increasing concern because of the expanding number of individuals at risk of infection, particularly children, pregnant women, elderly and the immune-compromised persons (Erdogurul and Sener, 2005). Intestinal parasitic infection may be acquired in different ways including consumption of contaminated fruits, vegetables, other food stuff, and water (Al-Binali *et al.,* 2006). The extent of the occurrence of parasitic eggs, cysts and larva on fruits depends on several factors that include the handling of untreated wastewater, poor personal hygiene, poor sanitation, and the use of faecal matter as fertilizer on the farm (Amoah *et al*., 2007). Faeces harbour helminth and protozoa eggs, cysts and larvae, according to Thaddeus *et al*. (2005), Amoah, (2009) and Hassan *et al.* (2013) farmers do not allow the faeces to decompose very well before application on the farm.

Soil-transmitted helminth infection is endemic in many areas of the world, principally in developing countries with poor environmental sanitation and personal hygiene (Naish *et al*., 2004). The mode of transmission is usually faeco-oral and there is high prevalence among people who live in areas with indiscriminate contamination of soil with human faeces, where sanitary facilities are inadequate. STI infection is mainly established by oral intake of infective eggs and, or cysts from the environment (Idowu and Rowland, 2006). Transmission takes place by direct contact with infected cattle but also indirectly through drinking water and eating fruits (Ortega *et al*., 1997). Fruits have nutritive values and are desirable, readily available by the road-sides and at major market places and as such, there is a great tendency to eat these fruits unwashed or improperly washed. Also the handling of fruits in market places allows for the transfer of parasites' infective stages to these fruits which are exposed for sight attraction, and even cut into pieces for affordability.

Regular consumption of fruits is associated with reduced risks of cancers, cardiovascular diseases (especially coronary heart disease), stroke, cataracts and some of the functional declines associated with aging (Halvosen *et al*., 2002). Diets that include a sufficient amount of potassium from fruits and vegetables also help to reduce the chance of developing kidney stones and the effect of bone loss (Halvosen *et al*., 2002). An important nutritional value of fruits is its antioxidant contents, fruits such as orange, carrot, garden egg and tomato have the highest antioxidant value which neutralizes free radicals which are harmful molecules that damage the body cells and cause inflammation (Halvosen *et al*., 2002).

The nutritional and health importance of fruits cannot be underestimated in that they contain substantial quantities of essential nutrients in a rational proportion. They are excellent sources of minerals, vitamins, enzymes and dietary fiber (Quebedeaux and Bliss, 1988). This study was therefore carried out to determine the prevalence of parasites of some fruits sold around Dutsin-ma, Nigeria and the risk of parasites' transmission via fruits and vegetables.

MATERIALS AND METHODS

Study Area

The study was conducted in Dutsin-ma Local Government Area of Katsina State. It is located on Latitude 12^0 27'18"N and longitude 7^0 29'29"E and has its headquarters in the town of Dutsin-ma. It has an estimated area of 527km^2 (203sqkm) and a population of 1,169,671 as at 2006 census(NIPOST

Retrieved 2009-10-20).The Local Government is bounded by Kurfi and Charanchi Local Governments to the North, Kankia Local Government to the East, Safana and Dan- Musa Local Governments to the South. The major occupation is farming and animal rearing, the inhabitant of the local Government are predominantly Hausa and Fulani (NPC, 2006).

Fig 1: Map of Katsina showing Dutsinma Local Government Area

Sample collection

A total of 180 fruit pieces were bought from five vending sites AB 1, AB 2, AB 3, AB 4 and AB 5 in Dutsin-ma metropolis where fruits were sold in large quantities on daily basis. The fruits bought included: garden egg (*Solanum melongena*), water melon (*Citrullus lanatus*), carrot (*Daucus carota*), orange (*Citrus sinensis*), cucumber (*Cucumis sativus*) and mango (*Mangifera indica*). The period of sample collection was peak of the rainy season. Each set of fruits was packaged into different sterile polythene bags, and transported to the Biological Sciences Laboratory of Federal University Dutsin-ma for examination.

Laboratory examination of fruit samples

Each fruit was washed with 100 ml of distilled water into separate containers and the resultant liquids were allowed to stand for 20 minutes in appropriately labelled specimen bottles. The supernatants were then discarded and the sediments centrifuged for 5 minutes at 2,000 revolutions per minute (Fagbenro, 2016).

Wet smear preparation

The sediments were examined in drops under the light microscope.

Floatation technique

The water was filtered in a clean sieve to remove debris and large particles. It was centrifuged at 2,000 (rpm) rotation per minutes for 3 minutes and the supernatant was discarded. The sediment in each tube was filled to the brim with zinc sulphate which served as the floatation media and left for 30 minutes with a clean glass slide placed on the upper end of its meniscus (Fagbenro, 2016).

Parasite identification and count

A drop of oil immersion was placed on each slide and examined microscopically. Identification was carried out using standard guide as described by Arora and Arora (2005).

Data analysis

The data was entered into the SPSS Spread Sheet 2010 which was used to determine significant variation in prevalence of the parasites in relation to the fruit types and vending sites. Descriptive statistics was used to get the mean and standard deviation. Chi-square test was used to determine association between fruits and infection

RESULTS

Some parasitic eggs, cysts and larva were observed in six parasites. Figure 2 including hook worm eggs *Ascaris lumbricoides*eggs, *Trichuris trichuira* eggs, *Strongyloides stercoralis* larvae, immature cyst of *Entamoeba histolytica* and eggs of *Taenia species.*The highest occurrence was recorded in the cysts of *E.histolytica* (31.62%) followed by eggs of *A.lumbricoides* (24.30%) and then the eggs of hookworm (16.42%); eggs of *Taenia spp.* (12.4%) and eggs of *T.trichuira* (8.62%) while the least occurrence was recorded in the larva of *S.stercoralis* (6.64%).

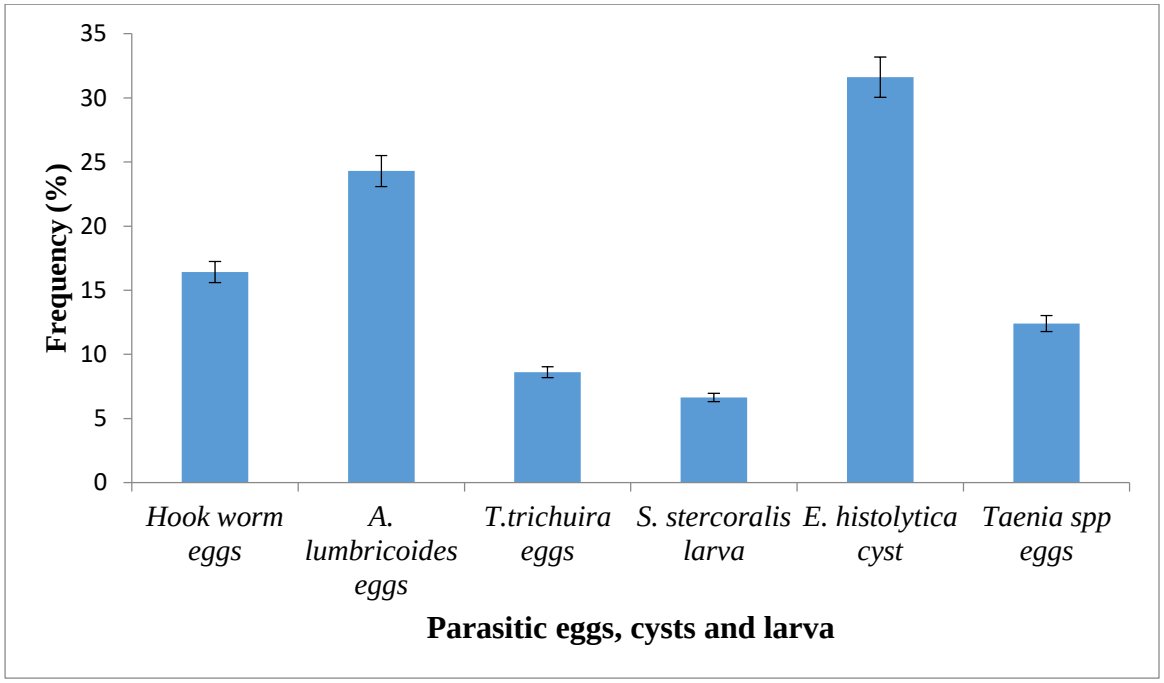

Fig 2: Occurrence of parasitic eggs, cysts and larva

The percentage of fruits with parasitic stages in Table 1 showed that garden egg recorded the highest prevalence of 60.3% followed by water melon (21.4%), cucumber (12.12%), mango (10%); carrot showed 4.8% while orange showed no prevalence.

Table 1: Presence of parasitic eggs, cysts and larva in fruits around Dutsin-ma metropolis

Fruit type	Number of fruits examined	Number of fruits with parasite	Prevalence (%)
Garden eggs	36	12	60.3
Water melon	28	6	21.4
Carrots	41	2	4.8
Oranges	12	0	0
Cucumber	33	4	12.12
Mangoes	30	3	10
Total	**180**	**27**	**15**

X^2cal – 5.26 and X^2 tab – 11.07 at p=0.030

The vending sites in Figure 3 showed that AB 3 had the highest frequency in the different sites (52.33%) followed by AB 1 (38.35%) then AB 5 (32.33%) and AB 2 (28.4%) while the least, 12.3% was from AB 4.

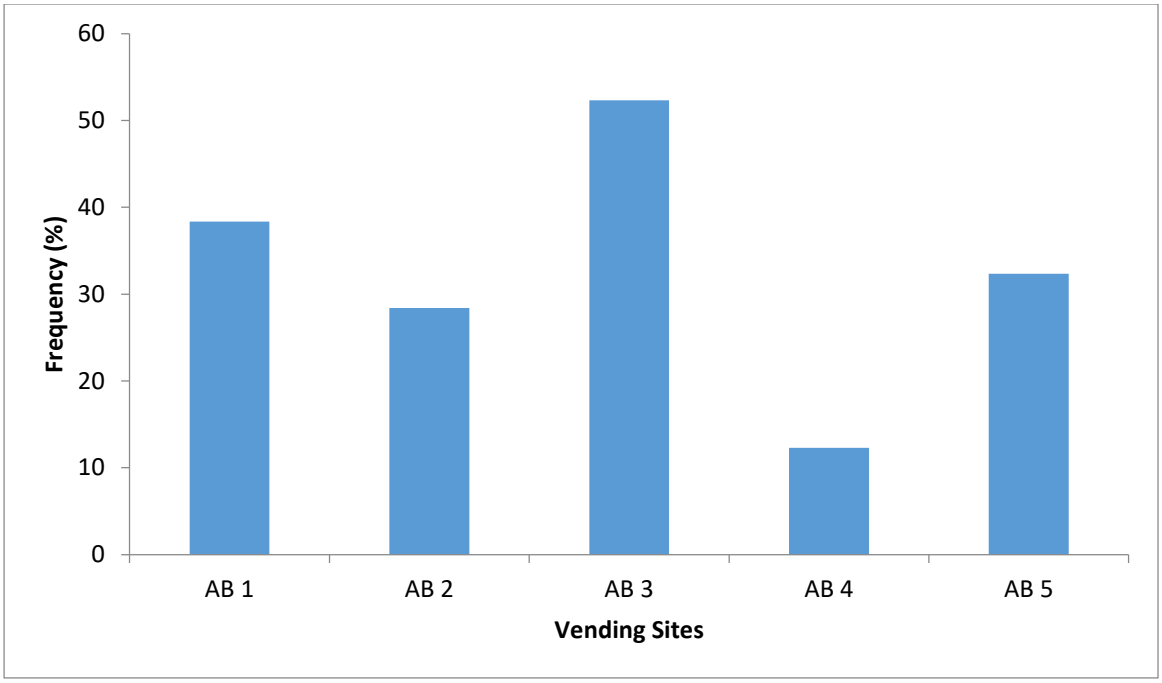

Fig 3: Occurrence of parasitic infection of fruits from sites AB1, AB2, AB3, AB4 and AB5

DISCUSSION

Fruits can become contaminated with microorganisms capable of causing human diseases while still on the plant in fields or orchards, or during harvesting, transport, processing, distribution and marketing, or in the home and are usually transmitted by contaminated water and spread by ineffective hygienic practice (Daryani, 2002). This study showed that fruits purchased from the five vending sites sampled contained intestinal parasite eggs, cysts and larva which are usually voided with faeces by humans and animals.

The source of acquisition of parasites' eggs, cysts or larva by the fruits examined from this research could be attributed to the usage of faecal matter as fertilizer which agrees with the studies of Uga *et al.* (2009) and untreated waste-water for irrigation purposes which also correlates with the work of Amoah, (2009) and Hassan *et al.* (2013).

A total overall prevalence of 15% of intestinal parasites on fruits reported in this study disagrees with the36% reported by Damen *et al*. (2007) in Jos and the 48.48% reported by Hassan *et al.* (2013) in Ibadan; this could be due to period of investigation and the total number of samples collected which were all at variance and the season of the year. The period of investigation could also explain such differences in percentages in that the period of this study coincided with the wet season characterized with high amount of rain-water and decreased tendency of contamination by the parasites because of water availability.

Among the parasites identified in this study, *E. histolytica* cysts and *A. Lumbricoides* eggs were the most commonly encountered on fruits. This is in agreement with previous reports (Abougrain *et al*., 2009; Ekwunife and Akolisa, 2009; Alli *et al*., 2011 and Hassan *et al.,* 2013). The reason could be because both parasites are connected with water and soil in most developing countries,

In this survey, percentage of the fruits sampled from the different vending sites showed that garden eggs and water melon recorded the highest agreeing with Hassan *et al.* (2013) who also reported the fruits as one of the most contaminated.

The vending sites of AB 3 and AB 1 were noted as the most unhygienic sites that enhanced the risk of transmission of intestinal parasites to buyers while AB 4 was the least. The reason for this could be due to poor storage and handling of the fruits by vendors of those sites. According to Saltveil, (1977), parasitic eggs and cysts can survive for a week or two or even a month depending on duration of storage of night soil and faecal-polluted water available for use by farmers and dealers in fruits.

In conclusion, the findings of this study are suggestive of parasitic stages present in the fruits an indication that consumers of raw fruits are at a high risk of intestinal parasitic infection. The relevance of fruit and vegetables in the diet cannot be over emphasized and so is the need for adequate enlightenment programmes at primary health care level to help reduce transmission and public health facilities should consider legislative actions towards improvement of production, storage and marketing of farm produce.

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