



Full Length Research Paper

The Role of Date Palm Fruits (*Phoenix dactylifera*) in the Transmission of Geohelminths in Nigeria

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ABSTRACT

The consequences of human infection with soil transmitted helminths (geohelminths) is of major health concern in developing countries. The transmission of such helminths are promoted by poor sanitation and personal hygiene such as insanitary handling of fruits and vegetables. A study to ascertain the geohelminths associated with Date palm fruits (*Phoenix dactylifera*) in Nigeria was conducted between February and July 2012. One thousand dry Date fruits each was purchased from three different locations (eastern, western, northern) of Nigeria. A total of 3000 fruits was acquired. Each of the fruits was washed in 10ml normal saline. Forty to fifty fruits were washed daily. Formol-ether concentration technique was employed to concentrate the parasites in the water. Sediments observed were placed on a glass slide and observed microscopically using x10 and x40 objective lens, for possible parasite ova. Of the 3000 Date fruits examined, 1057(35.2%) were contaminated with ova of parasites. Of the contaminated 1057 fruits, 701(66.3%) harboured soil transmitted helminths while 356 (33.7%) contained other parasites. Identified geohelminths include ova of *Ascaris lumbricoides*, *Trichuris trichura* and Hookworm. *Ascaris lumbricoides* was the most prevalent parasite encountered and this was statistically significant ($p < 0.05$). The number of fruits contaminated did not vary significantly ($p > 0.05$) with the regions of Nigeria where the fruits were purchased. Date fruits which is highly patronized by travellers in Nigeria due to its sweetness, cheapness and high nutritional value are associated with geohelminths. The dry fruits are often eaten as soon as they are bought by travellers. The contamination could possibly be as a result of insanitary handling by both hawkers and buyers, who dip their hands into the fruit heaps in receptacles to select or taste the fruit before purchase. It is therefore advocated among other measures, that cleaning and washing of the fruits before consumption will aid in breaking the transmission cycle of these parasites.

Key words: Date fruit, Geohelminth, Hygiene

Introduction

Soil transmitted helminths are also known as geohelminths. They complete a part of their life cycle in the soil after being extruded along with faeces. Important soil transmitted helminths are *Ascaris lumbricoides*, *Trichuris trichiura*, *Ancylostoma spp.*, *Toxocara canis* and *Toxocara cati* of dogs

and cats respectively (WHO, 1987). Helminthes remain prevalent throughout the world where they are promoted by several epidemiological factors such as poor sanitation, poor personal hygiene, irrigation and various agricultural practices such as the use of night soil as fertilizer in the farm (Ejezie 1981, Robertson and Gjerde 2001,

Richards 2002). Many studies in Nigeria have shown high prevalence of geohelminths among humans and their environment (Ejezie

Date fruit is one of the fruits commonly eaten in Nigeria. It is a one-seeded fruit. The date fruit (technically called a drupe) contains a hard, seed-bearing pit or endocarp. Pollinated dates are harvested from September to December. Because all dates on a tree may not mature at the same time, they are hand-picked several times during the fall from bunches on the trees. This ensures that the dates are picked at their peak level of sugar content and flavor. In some parts of the world growers cut entire bunches (like bananas) and allow them to ripen in warm rooms away from the trees, although hand-picked dates are considered the best. Since pollination and picking requires many repeat visits by workers to the crowns of the palms, large trees have permanent ladders attached to the main trunks. Dates have been the staple food and chief source of wealth in the irrigated deserts. It is a sugar-rich food with invigorating effect, and is useful in cases of fatigue. Because of its richness in sugars, vitamins and minerals (including iron), they are particularly beneficial to adolescents, youth athletes, pregnant and lactating mothers. They are imported into Nigeria from Egypt, Iran, Iraq (Heiman 1983, George *et al* 2005). However, in 2008, a feature in the Nigerian Television Authority (Morning News Express, November 20th 2008) showed that a plantation and nursery of dates established by the Ministry of Agriculture, Dutse, Jigawa State, Nigeria were thriving.

However, if care is not taken, this cheap source of vitamins, minerals and sugar could lead to poorer health if ingested with ova or larvae of geohelminths. This could lead to more serious health consequences. Reports on the pathological and other effects of these geohelminths abound (Ejezie 1981, Ukoli Ekwunife *et al.*, 2013

1981, Umoh *et al*, 2001, Eneanya and Njom 2003).

1984, Stephenson 1987, Haling 1993, Umoh *et al.* 2001, Asinobi *et al.* 2007). In Nigeria, most people especially travelers buy and eat date fruits without washing. Due to the manner the dry fruits are being handled and eaten by travelers from one part of Nigeria to another, this study was undertaken to determine their contamination status by parasites.

Materials and method

Study area

The study was carried out in different parts (Eastern, Western and Northern) of Nigeria. Nigeria is located in western part of Africa (fig 1). One state each was selected from each part of Nigeria as follows: Anambra(Eastern), Lagos(Western) and Bornu(Northern) . Nigeria is bordered on the east by Cameroon, northeast by Chad, west by Benin, north by Niger Republic and south by the Atlantic Ocean. It lies between latitude $9^{\circ}58'$ and $10^{\circ}0'N$ and longitude 8° and $8^{\circ}15'$ E. The climate is mainly tropical in nature. The two kinds of climate in Nigeria are dry and rainy seasons. The temperature ranges from $25^{\circ}C$ to $28^{\circ}C$ with no clear variation. Nigeria is one of the most densely populated countries of the world, comprising about 250 tribes. The population is 140,003,542 (as per 2006 Nigeria census). Christianity and Islamism are the two major types of religion practiced in Nigeria. The major occupation is farming and the major farm products are fruits and vegetables, yam, groundnuts, cassava and maize. Other occupation includes civil service and business which is mainly buying and selling of goods.

Study Sample/Technique

Total of 3000 fruits was acquired. Each of the fruits was washed in 10ml normal saline. Daily forty(40) to fifty(50) fruits were washed and processed. Each resultant suspension was strained through a piece of double layered cheesecloth, which filtered off particles but allowed the passage of helminth eggs and larvae. Each suspension was transferred to a clean labeled centrifuge tube. The filtrate was centrifuged at 2500rpm for one minute. Formolether Concentration Technique, as outlined by WHO (1991) and Ekwunife (2003) was used for further analysis of the sediments. After processing with formalin and ether and the supernatant decanted, the sediments were agitated to form suspension with the remaining fluid on the sides of the tube. A drop of the suspension was transferred onto a clean slide for microscopic examination under a cover slip using the X10 and X40 objectives. The whole area under the cover slip was checked for eggs and larvae. The process was systematically repeated until the sediment in each centrifuge tube was examined.

Statistical analysis

Data collected were analysed using descriptive statistics. Variation in contamination by type of parasite and region of Nigeria was tested using chi-square test.

RESULTS

Results showed that of the 3000 Date fruits examined, 1057(35.2%) were contaminated with ova of parasites (Table 1). The highest number of parasite was isolated from Date fruits bought from western part of Nigeria. However this difference was not statistical significant ($\chi^2 = 0.597$, $df=2$, $p>0.05$). Of the contaminated 1057 fruits, 701(66.3%) haboured soil transmitted helminths while 356 (33.7%) contained other parasites (Table Ekwunife *et al.*, 2013

One thousand dry Date fruits each was purchased from three different location (eastern, western, northern) of Nigeria. A 2). *A. lumbricoides* was the most prominent geohelminths encountered while hookworm was the least prevalent geohelminths. The difference in the types of isolated geohelminths was significant ($\chi^2 = 26.71$, $df=2$, $p>0.05$). Other parasites isolated are shown in table 2.

Table 1: Distribution of geohelminths ova on Date fruits from different parts of Nigeria.

Location	No. Examined	No. contaminated	% contaminated
Eastern	1000	351	35.1
Western	1000	360	36.0
Northern	1000	346	34.6
Total	3000	1057	35.2

Table 2: Ova or cyst of parasites haboured on the Date fruits from different parts of Nigeria.

Geohelminths	No. of fruits contaminated / (%)	Other parasites	No. of fruits contaminated / (%)
<i>A.lumbricoides</i>	436 (41.2)	<i>Entamoeba histolytica</i>	178 (16.8)
<i>T. trichuria</i>	193(18.3)	<i>Giardia lamblia</i>	101 (9.6)
Hookworms	72 (6.8)	<i>Enterobius vermicularis</i>	77 (7.3)
Total	701(66.3)		356 (33.7)

DISCUSSION

Findings show that some sweet Date fruits enjoyed by Nigerians are predisposed to contamination by geohelminths. Such contaminated fruits have serious health implications. The health implications of the encountered parasites have been reported (Stephenson 1987, Haling 1993, W.H.O. 2002).

This study showed that fruits bought from different parts of Nigeria were contaminated,

with more contaminated fruits coming from western part. The difference was however not significant at 5% level.

Highest number of Date fruits harboured the ova of *Ascaris lumbricoides*. This is in line with Eneanya and Njom (2003), who have reported that *A. lumbricoides* occurred most frequently in common fruits and vegetables in Nigeria. The contamination could possibly be as a result of improper handling by both hawkers and buyers, who dip their hands into the fruit heaps in receptacles to select or taste the fruit before purchase. Various factors may influence the contamination of Date fruits and other fruits. Some of which are globalization of food supply resulting in the introduction of pathogens into new environment through importation of farm produce. They are imported into Nigeria from Egypt, Iran, Iraq (Heiman 1983, George *et al* 2005). Others include use of untreated

waste water and manure as fertilizers for crop production, irrigation and various agronomics practices and habits of man. Contamination can also occur in the field or orchard during harvesting, transporting, processing, distribution and marketing or even in the home when fruits are handled under dirty environment (Hedberg *et al*, 1994).

Generally, parasitic contamination of fruits is more prevalent in areas of inadequate sanitation, poor personal and public hygiene. The high number of geohelminths ova isolated from Date fruits in this work showed the level of parasites in our environment. Such parasites are transmitted through feces. Good hygiene such as washing such fruits is advocated. Health education by health officers around our markets and motor parks, explaining the need of washing fruits especially Date fruits is very necessary.

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