

Application of Herbal *Carica Papaya* on Guinea worm Lesions: Responses to Health Questionnaire on this Local Practice at AI-Ezza

I.G. Ameh

Department of Pathology, CHS, Usmanu DanFodiyo University, Sokoto

Abstract: A cross-sectional examination of the inhabitants of rural AI-Ezza in Ado local government area of Benue State shows a guinea worm disease prevalence rate of 39.4% (n = 241). An evaluation of traditional method of guinea worm disease treatment among those affected shows that 62 (65.3%) out of 95 of patients applied decoction made from root, stem and leaf extract of pawpaw (*Carica papaya*) on guinea worm lesions. Statistical analysis however showed no association ($CX < 1$) between the application of herb and expulsion of worms or relief from guinea worm pain. The frequency and the popularity of this practice among patients who use it nonetheless underscore the galenic value of *Carica papaya*, that may be exploited for guinea worm disease treatment.

Key words: *Carica papaya*, guinea worm

INTRODUCTION

Guinea worm disease is endemic in many rural communities of Benue state^[1-4]. Affected persons suffer painful and disabling affliction, especially during epidemic outbreaks when the disease impose chronic illnesses, widespread human misery and extensive socioeconomic adversity in endemic communities^[5-7]. Some of the guinea worm disease presenting symptoms which exert serious burden of morbidity on patients include complications such as tetanus, gangrene, fatal blood poisoning, pericarditis, visual impairment, pregnancy complications, urinary obstruction, painful emergent worm blisters, urticaria, ulceration, abscesses, acute arthritis, paralysis and asthma among others^[6-10]. Victims of these symptoms often seek orthodox as well as traditional herbal remedy in endemic villages^[5,11-13]. Indeed the use of herbs to treat guinea worm disease is common practice among West African endemic country households^[5,11,13]. This report analyses responses to health questionnaire on the traditional use of *Carica papaya* extracts to treat guinea worm disease in study village. This investigation is relevant because no drug or herb has yet been conclusively tested as an effective guinea worm expellant^[6,12]. Moreover, higher plants such as *Carica papaya* are important sources of drug development^[14,15].

MATERIALS AND METHODS

Survey: In the study carried out between February and April of 2004, 241 randomly selected individuals were physically examined, in a cross-sectional survey, for symptoms of guinea worm disease at AI-Ezza in Ado

local government area, of Benue State, Nigeria. Emergent worm was taken as any skin lesion, from which adult guinea worm visibly emerged or from which guinea worm was microscopically identified from cold water washing of the lesion^[6,12]. An unstructured questionnaire was administered in a follow-up ethnographic study, to determine traditional symptom management practices and the efficacy of the use of *Carica papaya* to relieve guinea worm pain or extrude emergent worm.

Statistical method: The statistical Cross-product or odds ratio (CX) was used to test whether or not herbal application was associated with guinea worm extrusion and/or pain relief. The assumption is that these events were dependent and so associated ($CX > 1$) or independent and not associated ($CX = 1$ or $CX < 1$). The ratio was presented on a 2 x 2 contingency table equivalent to the statement as follows:

$$CX = \frac{(\text{Probability of cell a})(\text{Probability of cell d})}{(\text{Probability of cell b})(\text{Probability of cell c})}$$

RESULTS

Disease prevalence: The results showed (Table 1) that 95 (39.4%) of those examined (n = 241) had guinea worm disease. Proportion of cases among females (44.0%) was higher than among males (35.6%) while those of 11-20 years had higher percentages (53.1%) than any of the age brackets considered (Table 1). All patients complained of guinea worm disease pains while 62 (65.3%) of patients had emergent worm.

Table 1: Distribution of guineaworm disease in study village

Age group	Male			Female			Both Sexes		
	No. examined	No. infected	Infection rates (%)	No. examined	No. infected	Infection rate (%)	No. examined	No. infected	Infection rate (%)
0-10	28	12	42.8	25	11	44.0	53	23	43.4
11-20	22	12	54.5	27	14	51.8	49	26	53.1
21-30	19	5	26.3	10	5	50.0	29	10	34.5
31-40	25	8	32.0	11	6	54.5	36	14	38.9
41-50	13	3	23.0	12	5	41.6	25	8	32.0
51-60	10	4	40.0	14	4	28.5	24	8	33.3
60+	15	3	20.0	10	3	30.0	25	6	24.0
	132	47	35.6	109	48	44.0	241	95	39.4

Table 2: Proportion of herb users in relation to guineaworm extrusion

Herbal application	Guineaworm extrusion		
	Yes	No	Total
Yes	(a) 15 (0.158)	(b) 47 (0.495)	62 (0.653)
No	(c) 16 (0.168)	(d) 17 (0.179)	33 (0.347)
$CX = \frac{0.158 \times 0.179}{0.168 \times 0.495} = \frac{0.028}{0.083} = 0.34 < 1 \text{ i.e. No. association}$			

Table 3: Proportion of herb users in relation to pain relief

Herbal application	Pain relief		
	Yes	No	Total
Yes	(a) 28 (0.295)	(b) 34 (0.358)	62 (0.653)
No	(c) 20 (0.21)	(d) 13 (0.347)	33 (0.347)
$CX = \frac{0.295 \times 0.137}{0.21 \times 0.358} = \frac{0.04}{0.08} = 0.5 < 1 \text{ i.e. No. Association}$			

Decoctions: Sixty-two (65.3%) of patients applied root, stem and leaf extracts of pawpaw (*Carica papaya*) on guineaworm lesions. The decoctions were prepared and applied as follows:

Root extract: Scrappings of dug-out pawpaw root was sun-dried sparingly, mashed and slightly heated in a few drops of water and mixed with powdered pepper. This was locally applied on guineaworm lesions such as emergent worm bubo, sore, ulcer or arthritis at no specific dosage.

Leaf extract: Leaves of pawpaw often mixed with leaves of cow pea (*Vigna unguiculata*) were slightly sun-dried, crushed in woody mortar and mixed with pepper in a few drops of water. This decoction was squeezed and rubbed with the fingers onto guineaworm lesions including bubo, emergent worm, arthritic swelling and others, to expel worm and relief pain.

Stem extract: Preparation and application of stem extract is similar to the root extract. Depending on individual patient, the papaya decoctions was further mixed with cow-dung, red palm oil or additional extracts from mango, orange, guava and other tree plants.

Effect of decoction: Guineaworm disease response to herbal application was statistically measured and the result shows as follows:

Worm extrusion: The statistical analysis (Table 2) shows no association ($CX < 1$) between the application of papaya decoction and worm extrusion. This is because the probability (Table 2) of this occurring is less than one ($0.34 < 1$). However, 15 (15.8%) of the 62 patients who applied this decoction agreed that papaya actually effected the expulsion of their worms or quickened the process while 47 (49.5%) of them maintained that this was improbable (Table 2).

Pain relief: The result also shows (Table 3) that there was no association ($CX < 1$) between the topical use of papaya decoction and pain relief from guineaworm illness. The chance for this to occur is less than one ($0.5 < 1$) as shown (Table 3). However, 28 (29.5%) of the 62 patients who treat guineaworm with papaya confirmed the soothing effect of the herb, although a higher number or 34 (35.8%) of them did not get relief.

However, it was curious that 47 (49.5%) of patients whose worms failed to extrude (Table 2) and the 34 (35.8%) patients who had no pain relief (Table 3) from papaya application continued to use the decoction despite their awareness of apparent ineffectiveness of the process. Respondents claimed that the reason for this was because papaya decoction was more widely used and more readily available, at no cost, than orthodox therapy which was expensive, unavailable in remote villages and not trusted to cure patients who apparently suffer repeated exposure to the disease.

DISCUSSION

Morbidity data as recorded for study village is characteristic of endemic guineaworm disease in West Africa rural communities^[7,8,13]. In particular, the incidence of chronic guineaworm pains and crippling emergent worm compares with the disease in other endemic villages of Nigeria^[1,9,13]. This investigation also indicates that the use of papaya extract to treat guineaworm disease is wide-spread in study village. It is therefore probable that the autochthonous use of galenicals, in this case, papaya is a feature of many guineaworm endemic communities of West Africa^[4,5,8,11,13]. However, since statistical measurement of result shows that it is not probable ($CX < 1$) that papaya decoctions expelled worm or relieved guineaworm pains in study village, then it is possible that galenicals are used as readily available substitute where orthodox treatment is unaffordable, limited, unavailable or unreliable^[5,11,12]. It appears also that patients are compelled to use galenicals mostly in desperate need of relief from chronic and crippling guineaworm pains when orthodox treatment could not be used for reasons stated. The choice of papaya as an anti-guineaworm galenical in these communities probably derives from its tested biological activities as anti-microbial and an anti-parasitic vermifuge^[15-17]. It has been shown as well that papin and xylitol are important active medicinal constituent or drug product of papaya^[14,17,18]. This study suggests a possible guineaworm expulsion and pain relief property of papaya as admitted by an insignificant but observable proportion of patients who use the plant as a galenical.

REFERENCES

1. Edungbola, I.D., S.J. Watts, O.O. Kale, G.S. Smith, D.R. Hopkins, 1986. A method of rapid assessment of the distribution and endemicity of dracunculiasis in Nigeria. *Soc. Sci. Med.*, 6: 555-558.
2. Onwuliri, C.O.E., R.C. Obi and J.C. Anosike, 1988-90. Guineaworm infection in Oju and Okpokwu L.G.A. of Benue State. *Nig. J. Parasit.*, 9-11: 27-31.
3. Obe, P.A.I. and J. Daagu, 1991. Report on rapid reconnaissance survey in Oju L.G.A., Benue State In: Rusafiya project: UNDP- Assisted Rural Water Supply and Sanitation ProjectNIR/87/011, pp: 43.
4. Ameh, I.G. and C.O.E. Onwuliri, 1995. Knowledge, attitudes, practices, belief (KAPB) and certain socio-economic attributes of guineaworm disease among a rural community, Benue State, Nigeria. *Nig. J. Parasit.*, 16: 27-32.
5. Belcher, D.W., F.K. Wurapa, W.B. Ward and I.M. Lourie, 1975. Guineaworm in southern Ghana: its epidemiology and impact on agricultural productivity. *Am. J. Trop. Med. Hyg.*, 24: 243-249.
6. Muller, R., 1979. Guineaworm disease: Epidemiology, control and treatment. *Bull. W.H.O.*, 56: 683-689.
7. Chippaux, J.P., A. Banzou and K. Agbede, 1992. Social and economic impact of dracunculiasis a longitudinal study carried out in two villages in Benin. *Bull. W.H.O.*, 70: 73-78.
8. Wurapa, F.K., D.W. Belcher and W.B. Ward, 1975. A clinical picture of guineaworm disease in Southern Ghana. *Ghana Med. J.*, 14: 10-15.
9. Kale, O.O., 1977. The clinico-epidemiological profile of guineaworm in Ibadan district of Nigeria. *Am. J. Trop. Med. Hyg.*, 26: 208-214.
10. Muller, R., 1971. *Dracunculus and Dracunculiasis*. *Adv. Parasit.*, (Ed. B. Dawes) 9: 73-151.
11. Ampofo, O., 1977. Some Clinical Observations of the Treatment of Selected Diseases by Herbal Preparations: Perspectives in Medicinal Plant Research Today. Pub: Research Unit, University of Ife, Nigeria, pp: 35-45.
12. Kale, O.O., 1977. Clinical evaluation of drugs for dracontiasis. *Trop. Doc.*, 7: 15-16.
13. Nwosu, A.B.C., E.O. Ifezulike, A.O. Anya, 1982. Epidemic dracontiasis in Anambra State of Nigeria: Geographical distribution, clinical features, epidemiology and socioeconomic impact of the disease. *Ann. Trop. Med. Parasit.*, 2: 187-200.
14. Farnsworth, N.R. and R.W. Morris, 1976. Higher plants: the sleeping giants of drug development. *Am. J. Pharmacol.*, 148: 46-52.
15. Leven, M., D.A.V. Berghe, F.M. Vlietinck and E. Lammens, 1979. Screening of higher plants for biological activity. *Planta Medica.*, 36: 311-321.
16. Emeruwa, A.C., 1982. Anti-bacterial substance from *Carica papaya* fruit extract. *J. Nat. Prod.*, 2: 123-127.
17. Pamplona-Roger, G.D., 2001. *Papaya Tree In: Encyclopedia of Medicinal Plants*. 4th Ed. Pub: Marpa Artes Graficas, Zaragoza, Spain. (Ed. Pamplona-Roger) pp: 435..
18. Jean-Louis, P., B. Boum and A. Cave, A., 1981. Action Antihelminthique du xylitol isole des Ecorces de *Carica papaya*. *Planta Medica. J. Med. Plant Res.*, 41: 40-47.