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Impact of Mass Deworming of School Children in Rural Communities in Rivers State, Nigeria: Option for Programme Sustainability

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Abstract: Three mass deworming exercises were carried out at 6-monthly intervals in Ekpeye and Ogba Kingdoms for children in public and private schools in 2007 and 2008. Over 24,000 pupils aged 2 to $12 years received oral pyrantel palmoate in three consecutive phases under the supervision of trained field staff with no complications. Pre-deworming and post-deworming surveys were conducted to determine effect of deworming on the prevalence of helminthiasis in both kingdoms. This study showed that school age children (5 to # 12 years) were the largest in school in both kingdoms and by implication likely to have the highest worm load. Gender distribution suggested that there were boys more than girls in schools in both kingdoms. In both kingdoms, there was a significantly high level of reduction in worm infestation and worm load. Deworming of school children provided an easy and sustainable access to the high risk group for helminthic infection and the integration of deworming into the routine activities of teachers and health workers, programme sustainability can be ensured. However, concurrent implementation of the holistic helminthic control package is essential to achieve an overall reduction in the disease burden.

Key words: Soil-transmitted helminthiasis % Mass deworming % School children % Ogba and Ekpeye Kingdoms % Nigeria

INTRODUCTION

According to World Bank ranking, soil-transmitted helminth (STH) infection causes more ill health in children aged 5-15 years than any other infection. Based on this, global agencies recommend mass deworming to children in developing countries [1-2]. In 2001, the World Health Assembly (WHA) urged all member states endemic for soil-transmitted helminthiasis (STH) to attain a minimum target of regular administration of chemotherapy to at least 75% and up to 100% of all school-age children at risk of morbidity by 2010 [3]. Hookworm, roundworm and whipworm, the main causes of STH, infect about 2 billion people worldwide including 800 million school-age children. About 300 million people are severely ill due to worms (>50% school-age children) and 135,000 STH-related deaths occur annually [4]. Worm infestation could have significant effects on the development of children [5]. Any effect on physical development would typically be subtle and chronic, manifesting as longstanding anaemia [6], reduced physical fitness and somewhat constrained growth. There might also be subtle, but important developmental effects on cognition and educational achievement [7-8].

Globally, it is estimated that almost 200 million pre-school age children (PSAC) are stunted, 33% of which live in developing countries. STH infections are an important factor contributing to malnutrition in this age group [9]. The main strategy for controlling these infections is the provision of large-scale preventive chemotherapy to the population at risk [1]. Other recommended strategies for the control of most of the helminthiasis are the improvement of sanitation and water supply and provision of health education.

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The objective of this study is to provide an easy access of antihelminths to vulnerable groups in some rural schools in Rivers State and to discuss the options for the sustainable control of helminthic infections in school children.

MATERIALS AND METHODS

Three phases of deworming programme were carried out between July 2007 and May 2008 in Ekpeye and Ogba kingdoms of Rivers State, Nigeria.

Study Areas: Ekpeye kingdom consists of 13 communities located in Ahaoda-east and Ahaoda-West Local Government Areas with headquarters at Ahaoda and Akinima respectively. The Ogba kingdom consists of 16 communities and is part of Ogba/Egbema/Ndoni Local Government Area with headquarters at Omoku. There are about 23 nursery and primary schools in Ekpeye kingdom with an estimated population of 13,485 pupils while Ogba kingdom has a total of 61 nursery and primary schools with an estimated population of 16,589 pupils.

Methodology: In order to obtain cooperation and participation in the deworming exercise, advocacy/sensitization meetings and community mobilization activities were carried out in the affected communities. Advocacy and sensitization sessions were also held with the Care-Taker Committee chairmen and Primary Health Care Coordinators of the affected Local Government Councils. During these meetings, the public health impact of Soil-Transmitted Helminths was explained by community physicians who served as resource persons. The ministries of Health and Education, major stakeholders in school and health programmes were also involved. At the end of the meeting, each group endorsed their approval for the deworming exercise. Before the commencement of the deworming exercise, health workers were trained and recruited into the deworming team based on the result of the post-training evaluation. The anthelminthic drug used was pyrantel pamoate (combantrin®) supplied by Neimeth Pharmaceuticals.

Study Population: A total number of 24,409 pupils were dewormed in the first phase (July, 2007) while 24,435 pupils were dewormed in the second phase (December, 2007). In the third phase (May, 2008), 23,397 pupils were dewormed. The drop in the number of children dewormed in the third phase was due to shortage in drug supply. The drug dosage administered was according to the manufacturer's instruction and according to the age of the pupil. The steps and strategies used in the exercise were as recommended by WHO [10].

Pre-deworming Survey: Prior to the deworming exercise, a pre-deworming survey was carried out to determine the prevalence of helminthiasis among the school children in the above-mentioned kingdoms [11].

Post-deworming Survey: At the end of the deworming exercise, a post-deworming survey was carried out to determine the effect of the deworming on the prevalence of helminthiasis in the affected kingdoms.

Study Analysis: The result of the study was analyzed using analysis of variance (ANOVA).

RESULTS

The deworming exercise was carried out in three phases. In the first phase, a total number of 24,409 pupils were dewormed. Out of this number, 31.3% were between the ages of 2-4 years, 48.1% were between the ages of 5-11 years while 20.6% were above 11 years of age. In the second phase, 24,435 pupils were dewormed. About 25.4% of this number was between the ages of 2-4 years while 44.0% were between the ages of 5-11 years. Up to 30.5% of the pupils dewormed in the second phase were above 11 years of age. Up to 23,397 pupils were dewormed in the third phase. About 33.9% of this was in the age bracket 2-4 years while 47.1% of this was in the age bracket 5-11 years. Pupils above 11 years made up to 18.9% of the pupils dewormed in this phase. Most pupils dewormed were between the ages of 5-11 years (Figure 1).

Fig. 2: Shows the gender distribution of children dewormed in the three phases. It was observed that more males were dewormed in each phase than females. The percentage number of males dewormed was 52.2%, 53.3% and 52.3% for phases 1, 2 and 3 respectively.

Percentage reduction in worm infestation is presented in figure 3. In both kingdoms, there was a significantly high level of reduction in worm infestation ($P<0.05$). The highest level of reduction was observed in pupils above 11 years of age (80.0% and 93.3% reduction for Ekpeye and Ogba kingdoms respectively). Pupils between the ages of 5-11 years had 76.1% and 70.7% reduction in worm infestation for Ekpeye and Ogba kingdoms respectively. In Ekpeye kingdom, pupils between the 2-4 years had 68.4% reduction in worm infestation while 70.4% reduction was observed in Ogba kingdom in the same age bracket.

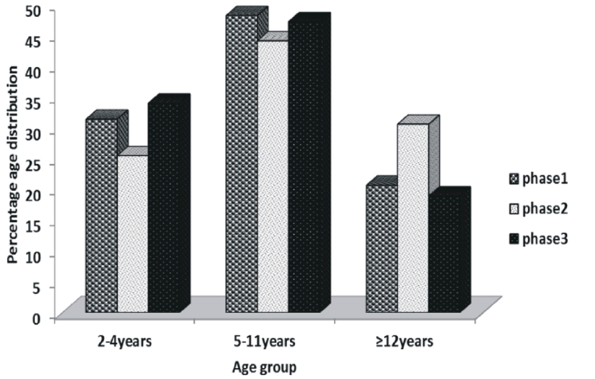

Fig. 1: Percentage distribution of children dewormed in the three phases

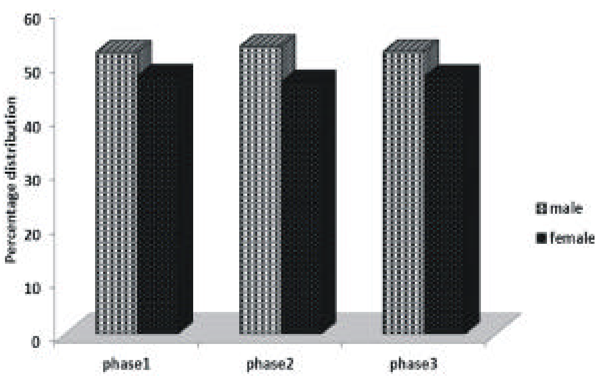

Fig. 2: Gender distribution of children dewormed in the three phases

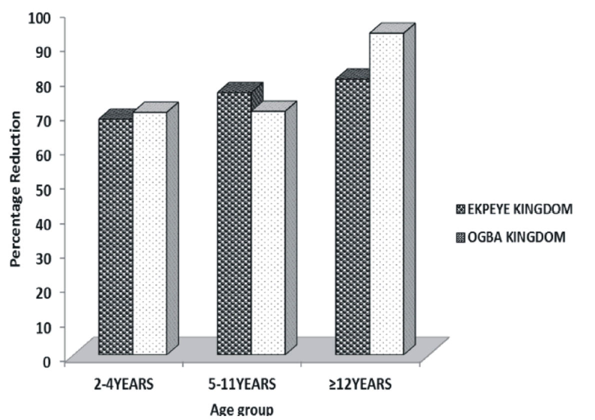

Fig. 3: Percentage reduction in worm infestation

There was also a significantly high level of reduction in worm density in both kingdoms (P<0.05). The highest reduction was observed in pupils above 11 years followed by those between the ages of 5-11 years (Figure 4 and 5). The level of reduction in worm density was more in Ekpeye kingdom than in Ogba kingdom.

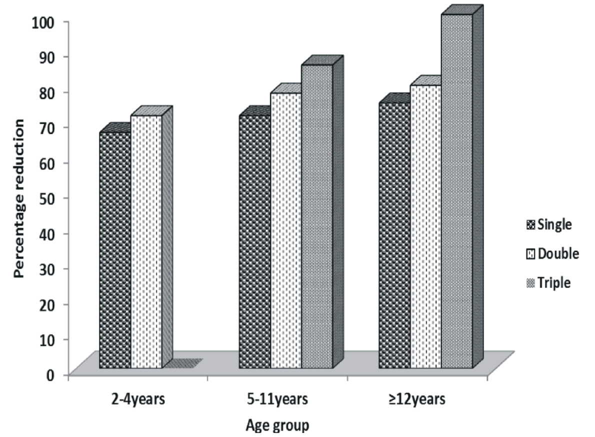

Fig. 4: Percentage reduction in worm density in Ekpeye kingdom

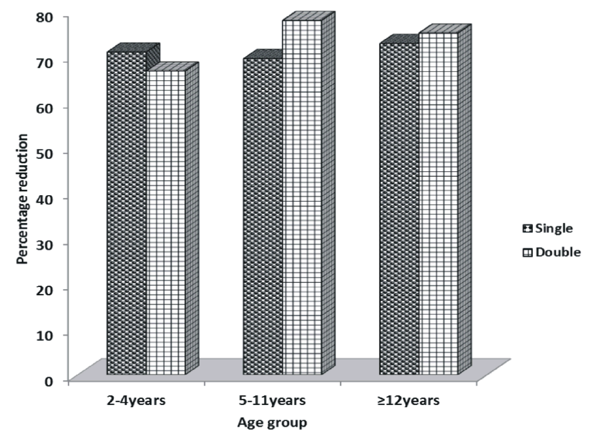

Fig. 5: Percentage reduction in worm density in Ogba kingdom

DISCUSSION

This study showed that school age children (5 to <11 years) were the largest in school in both kingdoms and by implication likely to have the highest worm load and being at the peak of their growth, worm infestation aggravate existing malnutrition and anaemia thereby contributing to retarded growth, increased vulnerability to other diseases, school absenteeism and poor learning. Helminthic infection has been reported to be associated with poor nutrition, inadequate sanitation and lack of clean drinking water [8]. Crompton and Nesheim [12] opined that the growth in STH-infected children is compromised through a variety of mechanisms, including reduced food intake due to mal-absorption and/or reduced appetite. As a result, infected children show a higher level of stunting [9, 13]. Helminthic infections are also associated with nutritional deficiencies, particularly of iron status and vitamin A, with improvements in iron status and increased vitamin A absorption after deworming [14]. Initial control strategy targeted at reducing the number of people who were infected was found to be ineffective because of the high rates of re-infection in the presence of poor sanitation. It is now clear that instead of reducing the number of people with worms, reducing the number of worms in each person is vitally more important for the health of the individual. This approach implicitly recognizes that re-infection will occur until effective clean water and sanitation facilities are installed. Regular treatment of high-risk groups prevents the development of severe worm load with its consequences. In the present study, it was observed that the deworming exercise greatly reduced the prevalence of helminthiasis and worm load among the pupils in both kingdoms.

It was observed that delivering deworming programme through schools is the most cost-effective way to regularly treat one of the key high-risk groups. This is in agreement with the finding of Partnership for Child Development [15] who proved that treatment of this group produces substantial returns in terms of reduced morbidity, improved growth and improved educational outcomes. However, the control of STH requires the application of the following worm control package: 1) Make sure that anthelminthic drugs are available at local health services; 2) Regularly treat high risk groups; 3) Piggy back unto existing channels 4) Educate communities to change behavior; and 5) Promote clean water and sanitation.

The donor driven nature of this deworming exercise makes it unlikely to be sustained since the partners may have other areas of concern. However, with the adoption of deworming as one of the activities in the Child Health Week and now as part of the Integrated Maternal, Newborn and Child Health Weeks in Nigeria, it is expected that children under 5 years of age who suffer more from the nutritional impacts of helminthic infections will have a lease of life. However, the school age children who are not covered by these outreach programmes can only be reached by integrating the exercise into the school programme. School teachers can be trained to administer anthelminthic drugs at the beginning of each academic session-this will ensure that all school children receive two doses of anthelminthic drugs.

The lesson learnt include the success of using the school for mass deworming therefore the need to integrate mass deworming into a reactivated school health programme for sustainability. The non-sustainability and implementation of other strategies for STH control and the benefits of deworming to individual child highlights the need to work towards the attainment of the World Health Assembly (WHA) target of at least 75.0% deworming coverage for primary school children. The World Health Organization (WHO) recommends, whenever possible, the integration of control activities for the NTDs [16] to contain costs and increase efficiency.

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