

SHORT COMMUNICATION

Occurrence of diarrhoea among infants and children in Ekiti State, Nigeria: A retrospective study

David, O. M.¹, Oluyeye, A. O.¹ and Famurewa, O.^{1,2*}

¹Department of Microbiology, University of Ado-Ekiti, Nigeria.

²College of Science, Engineering and Technology, Osun State University, Osogbo, Nigeria.

E-mail: ofamurewa@gmail.com

Received 9 December 2010; received in revised form 10 February 2010; accepted 24 February 2010

ABSTRACT

A six-year retrospective study of the prevalence of diarrhoea among infants and children in 64 health care facilities including 48 basic health centers and 16 comprehensive health centers in Ekiti State, Nigeria was carried out as a preliminary determination of the rate of diarrhoea among children. Data in the medical records in the healthcare facilities between the years 2002–2007 were extracted to determine the rate of diarrhoea in the state. Prospective study is recommended for Local Government with the highest prevalence rate of infantile diarrhoea. Ikere Local Government Area recorded the highest prevalent with 265 cases made up of 131 male and 134 female followed by Gboyin Local Government Area with 130 and 118 cases in male and female, respectively. Ilejemeje and Moba Local Government Areas had the least cases of dysentery, within the period of the study, with 75 and 95, respectively. The highest cases of diarrhea were recorded in 2006; 380 male and 358 female, followed by 2007 with 588 cases. Year 2002 had the least number of cases of diarrhea, with 110 and 81 in males and females respectively.

Keywords: diarrhea, infants, children, stool, pathogens, Ekiti State

INTRODUCTION

Diarrhoea is the passage of unusually loose or watery stools, usually at least 3 times in a 24 h period (Huppertz, 1986). However, it is the consistency of the stools rather than the number that is most important. Frequent passing of formed stools is not diarrhoea. Babies fed only breastmilk often pass loose, "pasty" stools; this also is not diarrhoea (Adkins and Santiago, 1987). Diarrhoea is one of the leading causes of death in young children in developing countries; under five year old children had 2.2 episodes of diarrhoea per year (Parashar *et al.*, 2003)

The mortality rate of diarrhoea is low (about 7.7%) but its morbidity rate is higher in HIV positive children (Taylor *et al.*, 1986). An estimated 1.87 million children below 5 years die annually from diarrhoea. Eight out of 10 of these deaths occur in the first two years of life. On the average, children below 3 years of age in developing countries experience three episodes of diarrhoea each year (Goma Epidemiology Group, 1995).

Many diarrhoeal deaths are caused by dehydration. Diarrhoea of any aetiology (*Giardia duodenalis*, *Entamoeba histolytica*, *Cryptosporidium* spp., *Vibrio cholerae* O1 or O139, *Escherichia coli* or *Shigella dysenteriae*) and at any age, except when it is severe, can be safely and effectively treated in over 90% of cases. Bloody diarrhoea and persistent diarrhoea with

malnutrition are also important causes of death (WHO, 2005).

The objective of this study is to determine the seasonal, age and geographical distribution of diarrhoea in Ekiti State.

MATERIALS AND METHODS

A 70-month (January 2002–October 2007) retrospective study was carried out to determine the incidence of infantile diarrhoea infection in 64 health care facilities in Ekiti State, Nigeria. The study was carried out in both primary health and comprehensive health centers in all the 16 local government areas of the state. Hospital records of all infants diagnosed to be infected with diarrhoea were taken. The following information was obtained from the records; age, sex, local government, month of admission and location of the patients. Statistical analysis

The data were analyzed using the Statistical Package for Social Scientists (SPSS, version 11). Any significant difference between the values was assessed at 99.95% level of significance (i.e. $p \geq 0.05$).

RESULTS AND DISCUSSION

During this research work, all the sixteen (16) local government areas in Ekiti State, Nigeria were visited from

January 2002 and December 2007. Data were collected from the medical records from 64 health centers. Two basic and two comprehensive health centers were selected from each local government.

Ikere Local Government Area recorded the highest cases of dysentery in 265 children made up of 131 male and 134 female, followed by Gboyin Local Government Area with 130 and 118 males and females respectively. Ilejemeje and Moba Local Government Areas had the least cases of dysentery, within the period of the study, with 75 and 95 respectively. The highest case (837) of diarrhoea were recorded in 2006 (380 males and 358 females) followed by 2007 with 588 cases (Table 2). Year 2002 showed the least number of diarrhoea cases which involved 110 males and 81 females were recorded.

The highest number of dysentery cases was recorded in month of May with the total number of 327 (Table 3), while the lowest dysentery case was recorded in month of December with the total number of 192. According to Table 1, dysentery was prevalent among infants between ages 1 month and 1 yr. In this age range males had the higher number of occurrence of 960, while females recorded 841. Children between the ages of 1.1 and 2.0 yrs showed 202 and 196 numbers of males and females affected respectively. This has been attributed to the immature nature of their immune system in these early periods of life (Huttley *et al.*, 1997). The factors contributing to the high incidence of dysentery among young children in developing countries certainly include over-crowded conditions, poor sanitation, contaminated water, inadequate food hygiene and mode of feeding practices which are dictated by culture, tradition and socio-economic status, among others are significant,

predisposing factor among people especially children to disease in developing countries (Ogbonnaya *et al.*, 2008). The least occurrence was 134 (59 males and 75 females) recorded among children between 4.1 and 5.0 years. The occurrence of diarrhoea decreased with age, this trend has been reported by Goma Epidemiology Group (1995). Children who are in age group 6–12 months and above 2 years are breastfed also given traditional weaning foods such as starchy pastes made with guinea corn, rice and maize in bottle feeders. Children of less than one year who are not exclusively breastfed but are artificially fed with baby formula, tea or pap in addition to significant method of breastfeeding are prone to infection (Feachem and Kohlinsky, 1984).

The incidence of dysentery in 2002 and 2003 does not vary significantly (at $p \geq 0.5$). Based on this study, it is noteworthy that the incidence rate of diarrhoea was higher in males (n=1500) than in females (n=1406) as shown in Table 2. The lower rate in infants under 6 months is due to protective effect of breastfeeding or the presence of passively acquired maternal serum antibodies (Black *et al.*, 1982; CDC, 1994; WHO, 2005).

The findings are compared with other work documented by some researchers who concluded that incidence of dysentery is higher in the age group 6 to 60 months, when weaning often occurs, this pattern reflects the combined effects of declining levels of maternally acquired antibodies, the lack of active immunity in the infant, the introduction of food that may be contaminated with faecal bacteria and direct contact with human or animal faecal materials when the infants start to crawl (Schorling and Auliffe, 1990).

Table 1: Distribution age distribution of infants infected with infantile diarrhoea in Ekiti State

Local government area	Age (years)										Total	Grand Total	
	≤1m–1.0		1.1–2.0		2.1–3.0		3.1–4.0		4.1–5.0				
	M	F	M	F	M	F	M	F	M	F	M	F	
ADO	51	23	8	12	14	28	14	12	6	12	93	87	180
EFON-ALAAAYE	71	68	15	10	18	13	13	14	2	7	119	112	231
EMURE	40	34	8	12	7	10	6	8	2	6	63	70	133
EKITI EAST	65	52	15	15	12	10	5	8	3	6	100	91	191
EKITI SOUTH WEST	56	51	14	14	14	10	6	7	2	2	92	84	176
EKITI WEST	82	62	12	13	11	11	16	4	1	7	122	97	219
GBOYIN	89	76	14	11	12	20	9	9	6	2	130	118	248
IDO-OSI	65	50	23	17	7	7	3	5	1	6	98	86	184
IJERO	51	45	10	11	11	5	2	6	2	1	78	66	144
IKERE	84	90	23	18	10	13	12	10	2	3	131	134	265
IKOLE	92	70	16	12	8	10	14	14	4	2	134	108	242
ILEJEMEJE	15	20	6	7	2	5	3	8	7	2	33	42	75
IREPODUN-IFELODUN	37	35	4	13	9	3	5	3	6	4	61	58	119
ISE-ORUN	65	61	19	11	14	16	11	12	5	6	114	106	220
MOBA	24	31	7	4	5	7	2	7	5	3	43	52	95
OYE	56	54	14	15	10	13	4	8	5	5	89	95	184
TOTAL	960	841	202	196	164	181	125	134	59	75	1500	1406	2906

Table 2: Distribution of diarrhoea in the sixteen local government areas in Ekiti State

Local government area	Year												TOTAL	Grand Total	
	2002		2003		2004		2005		2006		2007				
	M	F	M	F	M	F	M	F	M	F	M	F			
ADO	11	10	15	14	18	16	15	15	17	16	17	16	93	87	180
EFON-ALAAAYE	25	15	16	14	13	18	17	24	31	27	17	14	119	112	231
EMURE	0	0	4	4	13	14	17	16	12	18	17	18	63	70	133
EKITI EAST	14	11	12	8	22	20	18	20	21	15	13	17	100	91	191
EKITI SOUTH WEST	10	7	13	11	11	8	19	16	17	22	22	20	92	84	176
EKITI WEST	4	3	19	16	19	15	23	13	27	27	30	23	122	97	219
GBOYIN	8	6	10	10	23	21	22	20	33	33	34	28	130	118	248
IDO-OSI	0	0	3	5	11	10	9	10	55	38	20	23	98	86	184
IJERO	0	0	14	11	15	10	10	8	25	20	16	15	78	66	144
IKERE	2	2	19	20	25	23	26	29	27	25	32	35	131	134	265
IKOLE	11	8	23	16	34	28	16	14	32	27	18	15	134	108	242
ILEJEMEJE	0	0	0	0	8	10	7	9	10	14	8	8	33	42	75
IREPODUN-IFELODUN	4	3	0	0	9	11	16	16	23	16	9	12	61	58	119
ISE-ORUN	21	16	19	14	16	17	22	22	19	20	17	17	114	106	220
MOBA	0	0	5	6	6	9	14	15	11	15	7	7	43	52	95
OYE	0	0	8	6	22	12	22	26	20	25	17	26	89	95	184
TOTAL	110	81	180	155	265	242	273	273	380	358	294	294	1500	1406	2906

Table 3: Monthly distribution of infantile diarrhoea over a period of five years in Ekiti State

Local government area	Month												Total
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
ADO	13	16	26	13	17	14	20	13	17	10	11	10	180
EFON-ALAAAYE	16	14	20	24	30	22	15	16	21	12	22	19	231
EMURE	11	16	13	6	18	12	13	11	13	6	9	5	133
EKITI EAST	11	8	12	19	13	11	18	18	23	30	12	16	191
EKITI SOUTH WEST	19	18	14	17	23	24	20	8	16	5	8	4	176
EKITI WEST	30	15	18	18	26	16	21	25	14	6	19	11	219
GBOYIN	11	14	22	32	35	19	24	27	20	16	16	12	248
IDO-OSI	19	15	12	23	18	24	7	10	7	13	14	22	184
IJERO	14	14	10	10	26	31	12	13	2	4	6	2	144
IKERE	26	18	24	33	22	25	26	24	19	16	20	12	265
IKOLE	12	21	22	19	25	32	20	27	15	22	16	11	242
ILEJEMEJE	10	7	2	6	10	2	5	4	5	7	8	9	75
IREPODUN-IFELODUN	16	9	10	10	7	11	21	11	5	4	8	7	119
ISE-ORUN	14	22	14	19	30	19	17	17	19	23	13	13	220
MOBA	8	6	10	2	11	9	10	5	7	9	9	9	95
OYE	16	31	12	6	16	14	5	14	10	18	12	30	184
TOTAL	246	244	241	257	327	285	254	243	224	201	205	192	2906

REFERENCES

Adkins, H. J. and Santiago, L. T. (1987). Increased recovery of enteric pathogens by use of both stool and rectal swab specimens. *Journal of Clinical Microbiology* **25**, 158-164.

Black, R. E., Brown, K. H., Becker, S., Alim, A. R. and Huq, I. (1982). Longitudinal studies of infectious diseases and physical growth of children in rural Bangladesh. II. Incidence of diarrhoea and association with known pathogens. *American Journal of Epidemiology* **115**, 315-324.

- Centers for Disease Control and Prevention (1994).** Health status of displaced persons following Civil War-Burundi, December 1993-January. *Morbidity and Mortality Weekly Report* **43**, 701-703.
- Feachem, R. G., and Kohlinsky, M. A. (1984).** Interventions for the control of diarrhoea disease among young children prevention of breast feeding. *Bulletin World Health Organisation* **62**, 227-291.
- Goma Epidemiology Group (1995).** Public health impact of Rwandan refugee crisis: What happened in Goma, Zaire, in July, 1994? Goma Epidemiology Group. *Lancet*. **345**, 339-344.
- Huppertz, H. I. (1986).** An epidemic of bacillary dysentery in Western Rwanda, 1981-1982. *Central African Journal of Medicine* **32**, 79-82.
- Ogbonnaya, O., Nebe, A., Chigozie, J. U. and Ekperechi, S. A. (2008).** Aetiology of acute infantile diarrhoea in the South-Eastern Nigeria: An assessment of microbiological and antibiotic sensitivity profile. *The Internet Journal of Third World Medicine* **5**, 34-37.
- Parashar, U. D., Bresee, J. S. and Glass, R. I. (2003).** The global burden of diarrhoeal disease in children. *Bulletin of the World Health Organization* **81**, 236-241.
- Schorling, J. B. and Auliffe, J. F. (1990).** Malnutrition is associated with increased diarrhoea incidence and duration among children in an urban Brazilian slum. *International Journal of Epidemiology* **19**, 729-735.
- Taylor, D., Echeverria, P. and Pal, T. (1986).** The role of *Shigella* spp., enteroinvasive *Escherichia coli* and other enteropathogens as causes of childhood dysentery in Thailand. *Journal of Infectious Diseases* **153**, 1132-1138.
- World Health Organization (2005).** The treatment of diarrhoea: A manual for physicians and other senior health workers. WHO, Geneva. World Health Organization Regional Office for Africa. Inter-country meeting on dysentery in the African region. Harare, 09-12 October 1995. **1995**, 1-77.