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THE INFLUENCE OF ENVIRONMENTAL SANITATION PRACTICES AND HYGIENE ON THE INCIDENCE OF DIARRHOEA - THE CASE OF KOFORIDUA MUNICIPALITY, GHANA

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ABSTRACT

A case-control study was done using a convenience sample of 100 pairs of mothers and children (less than five years old) divided into two groups; the first group made of children with diarrhoea and their mothers (case group) and the second group made up of mothers and children who did not have diarrhoea (control).

A structured interview schedule and review of routine data were used to collect data.

Only 12.5% of children less than six months in the case group were exclusively being breastfed compared with 75% of the control group. 56% of the cases used water from unprotected wells for domestic activity while 70% of the control group used pipe-borne water. Also 24% of the case group did not cover stored water while 76% of the control group covered stored water. This demonstrated poor food and water safety.

Only 10% of cases had access to flushing water closets for human excreta disposal while the remaining 90% either used pit latrines or disposal into surrounding bushes.

It was recommended that good amenities for the disposal of refuse in the communities be provided by the government and the delivery of pipe-borne water be made more regular to the inhabitants. Further, appropriate education in simple language is to be offered by health personnel especially at Ante-Natal Clinic and on radio stations and mothers are to be encouraged to put into practice what they learn about the treatment and prevention of diarrhoea.

Keywords: Sanitation, Hygiene, Practices, Diarrhoea, Koforidua

INTRODUCTION

Diarrhoea is the passing of increased amounts (more than 300g in 24hours) of loose stools. It is a symptom of gastrointestinal infection caused by a virus, bacteria or parasite and can be acute (short term) or chronic (long term) - lasting more than two to three weeks

Diarrhoea occurs worldwide and most people are affected by diarrhoea at some time in their lives. Globally, 2.2 million people die every year from diarrhoeal diseases (including cholera); 90% are children under 5 years(1) mostly in developing countries and these children die from complications of diarrhoea such as dehydration and malnutrition.

The inclusion of water supply, sanitation and hygiene in the millennium

development goals underscores the fact that the world community has acknowledged the importance of their promotion as timely interventions to curtail under 5 mortality resulting from diarrhoea-related cases.

In Ghana today, under 5 mortality rate though has improved significantly from a high 215 in 1960 to 111 in 2003(2), a lot of concerns have been raised especially considering the fact that there has been an apparent slowing down in the mortality decline from 1989-2003, a decline of only 119 to 111(2). Hence, the Ghana Poverty Reduction Strategy target of achieving an infant mortality rate of ninety five per thousand (95/1000) by 2005 is under threat(1). Mortalities resulting from

diarrhoea is one of the main factors mitigating against the attainment of these goals.

METHODOLOGY

Koforidua is one of the four sub municipals in the New Juaben District in the Eastern Region of Ghana. It is the capital of the Eastern Region and it lies between latitude 60 N and 70 N.

The study was a case control study which was conducted between 17th April and 19th May, 2006 within the Koforidua municipality.

The study population was made up of two groups of fifty (50) each. The first group (CASE GROUP) was made up of parents who had children less than five (5) years old with diarrhoea. The second group was made up of parents with children less than five years old who did not have diarrhoea but were reporting with different sicknesses (CONTROL GROUP).

Both groups were interviewed at the child health out-patient department of the Koforidua Regional Hospital. Records of the hospital were also reviewed for diarrhoea cases in the previous two years. Systematic random sampling and Convenience sampling methods were used. For the control group, every third (3rd) parent was interviewed and for the case group, every parent was interviewed. The sample size was also selected by convenience.

The questionnaires were administered to respondents after explaining to them the

purpose of the study and assurance of strict confidentiality.

Responses were recorded immediately on the questionnaire.

The data was analyzed manually using Microsoft Office Excel. Participant's responses were converted into frequencies and percentages. The results were further represented on tables and charts.

Odds Ratio (OR) estimation and chi square analysis were done to establish the association between the various sanitation and hygiene practices and incidence of diarrhoea.

RESULTS

Table 1 shows the Demographic characteristics of the Respondents. Of the two groups used for the survey, children of the Respondents aged between 24 and 59 months were in the majority (42% for the case group, 54% for the control group).

Table2 summarizes the factors influencing the incidence of diarrhoea in Koforidua.

All 100 mothers interviewed had heard about diarrhoea. Majority of the mothers mentioned Ante-natal clinic (ANC) as the source of their knowledge (58% of the case group, 64% of the control group). The rest of the mothers mentioned other media such as TV/Radio, friends, home and school as their sources of information. As shown in Figure 1 the prevalence of diarrhoea in Koforidua has generally been increasing from 4143 in 2002 to 6127 in 2005.

Table 1 Background Characteristics of Respondents

Background Characteristic	Cases (N=50) %	Control (N=50) %
CHILD'S AGE(months)		
0-11		
12-23	38	36
24-59	42	54
SEX OF CHILD		
Male	64	44
Female	36	56
MOTHER'S MARITAL STATUS		
Married	74	66
Single	26	30
Divorced	0	4

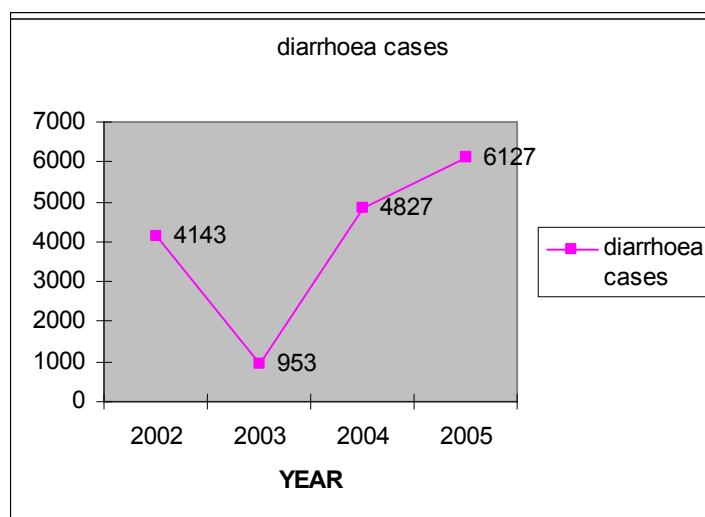
MOTHER'S RELIGION		
Christian	96	84
Moslem	4	12
Traditional	0	4
MOTHER'S EDUCATION		
None	4	18
Primary	16	6
Secondary	64	68
Tertiary	22	8
MOTHER'S OCCUPATION		
Trader	60	70
Artisan	22	2
Farmer	0	6
Formal	8	0
Unemployed	10	12

TABLE 2: Summary of results on factors influencing the incidence of diarrhoea in Koforidua Municipality , Ghana

Risk factor	Odds ratio	95% Confidence Intervals
Knowledge		
Poor knowledge on causes of diarrhoea	7.53	3.23 – 17.58
Poor knowledge on prevention of Diarrhoea	4.55	1.89 – 10.99
Personal Hygiene		
No hand washing before preparation of Meals	1.09	0.47 – 2.54
No hand washing before feeding a child	0.52	0.23 – 1.16
No hand washing after using the lavatory	10.44	3.34 – 32.56
Food and Water Safety		
Child less than six months not being Exclusively breastfed	21.00	7.93 – 55.63
Fruits not washed before being eaten	0.64	0.40 – 1.00
Water reservoirs not covered	10.10	4.20 – 24.50
Domestic waste/Excreta management		
Waste not covered at home	4.51	2.07 – 9.83
Unsafe mode of domestic waste disposal (not buried)	3.14	1.13 – 8.70
Unimproved toilet facilities	17.47	6.61 – 46.10
Treatment of diarrhoea		
Rehydration not a first line option	11.22	4.7 – 26.80

P<0.05

Figure 1 : PREVALENCE OF DIARRHOEA IN KOFORIDUA (2002-2005)



DISCUSSION

SOCIODEMOGRAPHIC INFORMATION

According to the Ghana Demographic Health Survey (GDHS) 2003, children less than six months are less likely to have diarrhoea due to their being exclusively breastfed and hence their lower level of exposure to contaminated food or water². However, this was not seen in this analysis and the reason could possibly be due to the fact that the category for exclusively breastfed infants extended beyond 6months to 10months, by which time the children must have started receiving supplementary feeds.

It is observed that more males (64%) had diarrhoea in the case group as against 36% of females. In the control group, 44% of the children were males whilst 56% were females. This result is possibly due to the unequal distribution of males and females in both groups

Majority of the respondents in both groups were married, 74% and 66% for the case and control groups respectively. This suggests that most children were born into stable family homes. The results further show that 96% and 84% of the case, and control groups respectively were Christians, 4% and 12% of the case and control groups respectively were Moslems whilst 4% of the control group were traditionalists. This is a true reflection of the population in Koforidua which is predominantly Christian.

The mothers interviewed were generally well educated with 60% to 80% of the entire population having pursued at least secondary

education. Interestingly, 60% of mothers in the case group were in this category. This finding does not agree with the observation made in the GDHS 2003 that the higher the level of education of a mother, the less likely it is for her child to get diarrhoea (3). This probably could be explained as being due to a gap existing between knowledge acquired and its application. Oni (1996) however recorded a similar finding in his study done in Ilorin, in Nigeria (3). Children of mothers

with secondary education had significantly higher risk of diarrhoea compared with children of illiterates (OR = 1.9; P < 0.05).

Most of the mothers were gainfully employed and earned modest income and majority of them were traders, 60% and 70% of the case and control groups respectively. 10% and 12% of the case and control groups respectively were unemployed.

KNOWLEDGE ABOUT DIARRHOEA

As shown in Table 2, the fact that most of the mothers heard about diarrhoea at ANC is perhaps an indication that there is increased patronage of ante-natal clinic services. This correlates with the data in the GDHS 2003 which indicates that there has been an 11% increase in utilisation of ANC services in the past fifteen years (3).

To ascertain whether mothers had detailed knowledge about diarrhoea, further questions were asked. This revealed that only 32% of the case group identified contaminated water or food as the cause of diarrhoea as against 78% of the control group which regarded contaminated food or water as causing diarrhoea. Besides, as much as 56% of the case group did not know the causes of diarrhoea as against 18% of the control group.

In addition, 82% of the control group answered 'yes' to the question 'can diarrhoea be prevented?', only 50% of the case group answered in the affirmative to the question. Added to these findings was the fact that only 36% of the case group regarded the practising of good hygiene as a way of curbing diarrhoea whilst 70% of the control group expressed likewise opinion. Indeed the study revealed that the depth of knowledge about diarrhoea in the case group was very shallow and inadequate and this may be due to the lack of understanding of the information they gained from the various sources. Indeed this analysis revealed that poor knowledge about the cause of diarrhoea increased the odds of reporting a case of diarrhoea by a factor of 7.53.

PERSONAL HYGIENE

Poor personal hygiene appears to be related to a high incidence of diarrhoea (Table 2). Only 40% of the case group practised hand washing with soap and water before preparation of meals and 42% of the control group also engaged in this practice. Further, that just 60% of the case group practised hand washing with soap and water after using the lavatory, whilst 94% of the control group practised this all the time. This is possibly a reflection on the lack of in depth knowledge about the transmissible routes of diarrhoea especially within the case group. The study thus indicated that the incidence of diarrhoea was greater in groups with poor practice of hand washing prior to the preparation of meals and after using the lavatory, with estimated odds ratio value for the former being 1.09. The chi square test of association between poor hand washing practise after using the lavatory was of the value 16.32 which at p value of 0.05 is statistically significant at one degree of freedom.

In many ways this analysis confirms results from several other studies such as one done by Huttly et al which revealed that poor personal hygiene leads to increased prevalence of diarrhoea(4). Relationship between hygiene practices and infantile health has also been identified in several investigations like those developed in Bangladesh and Ashworth et al also recorded an 11% reduction in the incidence of diarrhoeal diseases in some communities in Zaire where personal hygienic practices were improved(5).

FOOD AND WATER SAFETY

Very few mothers with children less than six months in the case group (12.5%) practised exclusive breastfeeding as compared to 75% of mothers of the control group. Breast milk is known to be protective against various gastrointestinal infections due to the presence of lactoferrins and lysozyme in the breast milk. These enzymes are known to have bactericidal, fungicidal and virucidal activity and the absence of this protective function in non-exclusively breastfed

infants possibly accounts for the increased incidence of diarrhoea in this group.

Besides, while 56% of the case group use water from wells for their domestic activities, majority (70%) of the control group use pipe-borne water. Most of the mothers interviewed revealed that the wells from which they fetched water were unprotected and the wells were also subject to seasonal fluctuations in the water level which led to discolouration (and associated contamination) of the water especially in dry season. Also, 24% of mothers in the case group do not cover water which is stored for use in the future as against 76% of mothers in the control group who keep their stored water covered. These modes of contamination must have led to the increased incidence of diarrhoea in the case group. Water reservoirs which were not covered appeared to be significantly associated with the incidence of diarrhoea with an estimated odds ratio value of 10.08 (Table 2).

When odds ratio and chi square test was performed on the data, whether or not fruits were washed before being eaten did not emerge as a significant determinant of diarrhoea prevalence. This might presumably be because of the small sample sizes; only more pronounced hygiene behaviours were statistically significant on their own. If one however looks at the overall picture, it is striking how consistent the trend is of increasing incidence of diarrhoea with poorer hygiene behaviour.

In many ways this analysis confirms results obtained from several other studies such as one carried out in East Africa (Uganda, Tanzania and Kenya) which reported that use of surface water showed significant odds ratio of 1.75(6). This was broadly consistent with earlier findings made which reported a significant association between diarrhoea prevalence and drinking surface water.

DOMESTIC WASTE MANAGEMENT AND HUMAN EXCRETA DISPOSAL

As in other studies, there is a very high association between poor waste management and excreta disposal and

incidence of diarrhoea. Results from this study show that majority of mothers in the case group (78%) kept domestic waste uncovered and 36% of mothers in the control group also did likewise. Keeping domestic waste uncovered increased the odds of having diarrhoea by 4.51 times. There were also poor waste disposal methods in both groups but this is worse in the case group, with 88% of mothers disposing their waste in the community dumping site (Exposed) as against 70% by the control group (Table 2).

In addition to the poor waste disposal methods seen in the case group, they also have the challenge of poor human excreta disposal, with only 10% of the group having access to flushing water closets and majority of the group disposing off their waste in pit latrines and the bush. In the control group, as many as 70% of the population have access to flushing water closets with just 10% resorting to disposal of excreta in the bush. The use of unimproved toilet facilities was significantly associated with the incidence of diarrhoea and an odds ratio of 17.47 was obtained.

An inadequate management of domestic waste refuse showed an odds ratio of 2.48 for infantile diarrhoea in Nigeria³ and similar result was also observed in Brazil.

TREATMENT OF DIARRHOEA

From this study, 52% of mothers whose children had diarrhoea said that their first intervention during an episode of diarrhoea will be to send the sick child to hospital. 86% of the control group also had this option as their topmost priority.

However, 42% of the case group admitted to the practise of self-medication and out of this proportion, only 22% of them thought of rehydrating their children with oral rehydration salt (ORS). For the control group, 14% practised self-medication and out of this proportion 76% provide rehydration through the use of ORS. Poor practice of rehydration was found to be significantly associated with diarrhoea. A test using chi square analysis gave a value of 29.17 which is statistically significant at a p value of 0.05 at on degree of freedom (Table 2).

67% of the children with diarrhoea experienced recurrence within one month

after the first episode whilst 21% of the control group also experienced recurrence.

The concept of oral rehydration therapy (ORT) rarely occurs to mothers when their children get diarrhoea and this assertion is strengthened by the results of this study especially among the case group. Poor or inappropriate treatment offered children suffering from acute episodes of diarrhoea lead to recurrence and this can be complicated by dehydration which plays a vital role in the upsurge of morbidity resulting from diarrhoeal illnesses.

Most of the mothers interviewed admitted to the fact that accessibility to healthcare is not a problem (94% for case group, 90% for control group) since most of them were registered on the National Health Insurance Scheme (NHIS).

PREVALENCE OF DIARRHOEA IN KOFORIDUA

Key informant interviews with some health workers attributed the high prevalence to the improved timeliness of weekly reporting of communicable diseases by the disease control and prevention unit of the public health department (Figure 1).

Further the easy accessibility to healthcare that has been made possible by the recently introduced National Health Insurance Scheme (NHIS) was also said to have contributed to the increased number of diarrhoea cases reported to the health facilities.

Direct interaction with the inhabitants also revealed that the supply of pipe-borne water is very irregular and hence many homes depend mainly on surface water, notably wells, for water for domestic purposes.

It was also observed from this study that a far greater proportion of the diarrhoea population consistently failed to practise the good principles of hygiene such as hand washing before meals. Many of such mothers who engaged in some of the 'good practices' did it just due to 'basic reasoning' and not out of understanding for the mode of transmission of the disease.

CONCLUSION

The study showed that there has been an increase in the prevalence of diarrhoea in the Koforidua municipal in the last three years and this is a health challenge.

All mothers had heard about diarrhoea and most mothers acquired their knowledge about diarrhoea from Ante-Natal Clinic.

The depth of knowledge of the case group was poor relative to the control group; fundamental knowledge about the cause and mode of prevention of diarrhoea was largely not known to this group. incidence of diarrhoea in this group appeared to be associated with the poor knowledge about the disease.

Personal hygiene was a real challenge in the case group. A significant association between poor hygiene and occurrence of diarrhoea was established from this study.

RECOMMENDATIONS

Government and policy makers

The government should be more proactive in the provision of good infrastructure for disposal of refuse. Waste reservoirs at community dumping sites should be emptied regularly to prevent overflow of refuse. Proper legislature should be made on the provision of standard toilet facilities in every home and water should be made available within reasonable distance from homes. The pipe-borne water supply to the township should be expanded to ensure wider coverage and regular delivery of safe water to homes.

The work of sanitary inspectors in the community should be enforced and properly supervised to ensure good standards of sanitation in the communities. Oral rehydration therapy (ORT) and good hygiene techniques should be taught at all stages of education. The Ministry of Health (MOH) and Ministry of Education (MOE) should be responsible for incorporation of this into school syllabus.

Healthcare Providers

The role of healthcare providers in the reduction of infant mortality resulting from diarrhoeal illness has been proven to

be invaluable by this study. More women are accessing ANC services and health personnel should thus ensure that education on management and prevention at this level is heightened. The message should be simple, and delivered in unambiguous language to eliminate the communication gap. Demonstration with visual aids will enhance the understanding of the fundamentals of the disease.

There is also the need for healthcare providers to be courteous and affable to patients so that their services will be patronized readily.

Role of Community and Individuals

The local radio stations should be encouraged to bring on health experts to discuss diarrhoea on their networks since quite a significant number of people enjoy their programmes. Mobile health vans should be used to propagate information on diarrhoea in various communities. Women in the main market should be a major target in this direction.

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