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Isolation of Some Pathological Agents Cause Diarrhea Among Children In Al-Kufa City-Iraq

عزل بعض المسببات الامراضية لمرض الإسهال بين الأطفال في الكوفة

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Abstract

The study was conducted to investigate some pathological agents caused diarrhea in children under five years age ,there were collected as (960) samples from cases of diarrhea for children auditors to the out-patient of Primary health care, (Kufa city), conducted from January, (2005) to January, (2007).

Results of the study showed that the number of infected children was 440 in 2005 dispersed in (216) males and (214) females, from the total number there were 79(18%) cases bottle feeding without boiled water ,comparison with (520) in 2006 dispersed in (270) males and (250) females, from the total number there were 119 (22.88%) cases were bottle feeding without boiled water.

Has also been investigated for the presence of chlorine in water samples isolated from different sources (river, tanks and water tap) by Chlorine Diethyl Paraphenylene Diamine were less than normal or negative for all samples.

It was also noted that there is a rise in the proportion of isolated parasites ,*G .lamblia* and *E. histolytica* in 2006 reaching to 140 (26.9%) , 112(21.5%) comparison with 2005 reaching to 129(29.3%), 92(20,9%) respectively,also been isolated and diagnosis of some microbial species and other variable rates which included *E,coli* ,motile bacteria and monilia .

المستخلص

أجريت الدراسة للتحري عن العوامل المرضية المسببة للإسهال عند الأطفال دون سن الخامسة من العمر آذ تم جمع (960) عينة من حالات الإسهال للأطفال المراجعين لمركز الرعاية الصحية الأولية في الكوفة (مسلم ابن عقيل) للفترة من(كانون الثاني 2005) و لغاية (كانون الثاني 2007) .

أظهرت نتائج الدراسة أن عدد المخمجين 440طفلا في عام 2005 توزعوا [(226ذكور(51,4%)] و[(214اناث (48,6%)] منهم [(79 طفلا (18%)] يـ تغذون على الرضاعة بالزجاجة بدون غلي الماء مقارنة مع عام 2006 حيث كان عدد الأطفال 520 توزعوا [270 ذكور(51,9%)] و[(250اناث(48,1%)] منهم [(119 طفلا (23%)] يـ تغذون على الرضاعة بالزجاجة بدون غلي الماء.

كما تم التحري عن وجود مادة الكلور في عينات المياه المأخوذة من مصادر مختلفة(ماء الإسالة ,الأنهار و الأحواض) لنفس الفترة الزمنية باستخدام كلورين اثيل بارافنيل , آذ بينت الدراسة أن نسبة الكلورين اقل من المعدل الطبيعي أو معدومة لجميع عينات المياه , كما لوحظ أن هناك ارتفاعا ملحوظا في نسبة عزل الطفيليات *E. coli , G. lamblia. E. hitolytica* في عام 2006 مقارنة مع عام 2005, كما تم عزل و تشخيص بعض الأنواع الميكروبية الأخرى و بنسب متفاوتة.

Introduction

Diarrhea is the passage of watery stools, usually at least three times in a 24 hour period. However, it is the consistency of the stools is more important than the number that is most important (1), and an increase in stool weight more than 200 g/day (2). Acute diarrhea remains a leading cause of morbidity and mortality (3).

In children all over the world especially in developing countries and causes (4%) of all deaths and (5%) of health loss to disability (4).

In Iran it has been estimated that diarrhea is responsible for 18 million cases of illness, 12 million medical visits, 1 million hospital admissions, and 516 deaths in children younger than 5 years of age (5).

It is one of the three biggest killers of children less than 5 years are newborn disorders, pneumonia and diarrhea (6). Diarrhea and respiratory infections are the first and second of most common cause of illness and death among children under 5 years old (7). Fifteen million children each year affected with diarrheal episode (8). A child under 5 in the early 1990 suffered from an average of about 4 episodes of diarrhea per year, by 1996-1997, we found that children were getting about 14 episodes of diarrhea in a year (9).

In Southeast Asia and Africa, diarrhea is responsible for as much as (8.5%) and (7.7%) of all deaths respectively (10), and between 21 and 37 million episodes of diarrhea occur annually (11). The mortality rates in the south and center of Iraq for children under 5 years of age had more than doubled that in north. For instance mortality rate had increased to 131 deaths per 1,000 live births which puts Iraq on the same plane as Haiti or Pakistan infant mortality rates were 108 deaths per 1,000 live births, which means in practical terms one in 10 children do not survive beyond their first birthday (12). The mortality rate has increased by a staggering 150 percent since 1990. Some 122,000 Iraqi children died in 2005 before reaching their fifth birthday (13).

Poor hygiene, lack of clean drinking water are the main causes of diarrhea, and it is a major killer, in 1998, diarrhea was estimated to have killed 2.2 million people, most of whom were under 5 years of age. Each year there are approximately 4 billion cases of diarrhea worldwide (14). While other says about 3.2 million child deaths annually (15). There are 30 controlled studies were compared data, randomized or quasi-randomized, of interventions to improve the microbiological quality of drinking water in settings where diarrhea is endemic, mostly in poor and developing nations. The studies involved more than 53,000 people (16).

In Iraq malnutrition rates are roughly double of those a year ago UNICEF, roughly (70%) of children recently seen by a Canadian medical team were suffering from diarrhea, cholera or typhoid .The UNICEF confirmed diarrhea, mainly due to unsafe water, causes (70%) of children's deaths in Iraq because the amount of raw sewage being dumped into water supplies has roughly doubled from 500,000 tons per day to 1 million tons per day (17). The most serious issue is diarrhea from water contamination, which proves fatal in many cases. Over (50%) of the country's water supply is contaminated because the infrastructure and water purification system were destroyed (15). *E. coli, G. lambalia E. histolytica* and other are causes of diarrhea in areas of endemicity include a wide variety of bacteria, parasites and protozoa (18). In Al-Najaf province *E. coli* and *G. lamblia* are the most common parasites cause of diarrhea in children (19). *E. coli* is one of the main species of bacteria living in the lower intestines of mammals, known as gut flora. Thus, treatments which kill all active bacteria, such as pasteurization or simple boiling, are effective for their eradication, without requiring the more rigorous sterilization which also deactivates spores. As a result of their adaptation to mammalian intestines, *E. coli* grow best in *vivo* or at the higher temperatures characteristic of such an environment, rather than the cooler temperatures found in soil and other environments (20). *E. coli* is also an indicator organism of contaminated or unsafe water (21). Most *E. coli* infections are spread through contaminated food or water, such as undercooked food or unwashed fruit that came into contact with animal manure *E. coli* infections, which usually affect kids during their first few years of life, also can be spread via contaminated swimming water and petting zoos (22). The primary cause of diarrhea is contaminated drinking water 2.5 billion incidents of illness are caused by contaminated water every year with microorganism.

Hospitalizations within (50%) in developing countries result from waterborne disease. The World health organization predicts that by 2025, the number of people without access to safe drinking water will increase to more than 2 billion safe water can be brought to the 1.4 billion people around the world, which can prevent 3.35 billion cases of illness and 5.3 million deaths caused each year by unsafe water (23).

Materials and methods

Questionnaires with demographic details, clinical history, physical signs, source of drinking water, type of feeding, in area with low income, high popular density large surface, poor water, food hygiene, and sanitation are common in communities with high levels of diarrhea disease were completed.

There were 960 samples of stool collected in sterile containers from the children who suffering from diarrhea, in the Primary health care center (Muslim Ibn Akeel) Kufa city , in period between January, 2005 to January, 2007.

Patients were children under 5 years with acute diarrhea, defined by the passing of three or more loose or watery stools in the 24 hour period prior to presentation. In the same time we examined samples of water had taken from different sources included tap water, river, and tanks, to determine the percentage of chlorine in it also water for culture to determine growth of microorganisms and general stool examination to determine existence of pathogenic agents.

Laboratory technicians were not given any clinical information, and all samples were processed as chlorine test that samples of water were collected from different sources by [(Diethyl Paraphenylene Diamine (DPD)], which is the quickest and simplest method for chlorine residual , were negative (24, 25), and bacteriological studies, culture of water samples that collected from different sources and places of Barakia of Kufa showed growth of *E .coli* (26) , routinely general stool examination was used to isolated and examined directly fresh stool specimens for detection microorganisms.

Results

All 186 water samples were collected in sterile containers from different sources that tested were less concentration than normal or negative for chlorine, normal chlorine residual is 0.5-2.0 parts per million. Stool samples that examined were showed *G. lamblia, E. coli, E. histolytica, monilia* and motile bacteria

As example in table (1) showed in 2005 the percentage of males 226(51.4%) was more than females 214(48.3%), ,also in 2006 the percentage of males 270 (51.9%) was more than females 250 (48.1%), table (2) showed in 2005 the biggest percentage of patients group was under one year 210(47.7%) ,in 2006 the biggest group was also under one year 258 (49.6%) , table (3) showed in 2005 the isolation of *G. lamblia* were 129(29.3%) it was more than other microorganisms and in 2006 *G. lamblia were* 140 (26.9%) also was more than other microorganisms causing diarrhea , and table number (4) showed the most infected patients 482(47.72%) with river water more than other water sources.

Table 1: reveals the distribution of cases according to gender

Years	Gender					
	Males No.	Percentages	Females No.	Percentages	Total of infected patients	Percentages
2005	226	(51.4)	214	(48.6)	440	(45.8)
2006	270	(51.9)	250	(48.1)	520	(54.2)
Total	496	(51.7)	464	(48.3)	960	(100)

Table 2: reveals the distribution of infected patient according to their age

Age group	Number of infected patient			
	2005 No.	Percentages	2006 No.	Percentages
Under 1 year	210	(47.7)	258	(49.6)
2-3 years	142	(32.3)	146	(28.1)
4-5 years	88	(20)	116	(22.3)
Total	440	(100)	520	(100)

Table 3: reveals the types of microorganisms appeared in the general stool examination according to years

Type of organism	2005	2006	Total number
G. lambalia	129(29.3)	140 (26.9)	269(26.73)
E. histolytica	92(20,9)	112(21.5)	204(21.18)
E. coli	91 (20,7)	93 (17.9)	184(17.52)
Monilia	74 (16.8)	92(17.7)	166(18.21)
Motile bacteria	54(12.3)	83(16)	137(16.33)
Total	440(45.8)	520(54.2)	960

Table 4: reveals the distribution of cases according to types of drinking water

Types of drinking water	years				
	2005		2006		
	Male	Female	Male	Female	Total number
River water	101(44.69)	99(46.26)	118(43.71)	109(43.6)	427(44.48)
Tank water	84(37.17)	71(33.18)	97(35.92)	83(33.2)	335(34.89)
Tap water	41(18.14)	44(20.56)	55(20.37)	58(23.2)	198(20.63)
Total	226	214	270	250	960

Discussion

Because of the low chlorine concentration or nil in all water samples collected from different sources which leads to growth of *G. lamblia*, *E. coli* ,giardia cysts can thrive in cold water for months, it is protected by an outer shell that allows it to survive outside the body for long periods of time and makes it tolerant to chlorine disinfection, rural areas depend on the river and tanks more than tap water. Rural households primarily have flush toilets which are attached to sewage systems while the large majority of rural households use free flow latrines small outhouse but hole is less than 1 meter deep and it is drained by letting feces run out of the back of the outhouse into the open ground. Some pathogens are often found in water, frequently as a result of fecal matter from sewage

discharges, leaking septic tanks, runoff from animal feedlots into bodies of water, overall, most persons do not purify their water in their house by adding chlorine or by boiling (27).

Only few families of households add chlorine or boil their water before drinking it. These purification processes are most prevalent in the rural destroyed areas and the study showed that the samples of the water were absent of chlorine that means the benefits of chlorine are absent, which they are; reduces many disagreeable tastes and odors; eliminates slime bacteria, molds and algae that commonly grow in water supply reservoirs, on the walls of water mains and in storage tanks; removes chemical compounds that have unpleasant tastes and hinder disinfection, and helps remove iron and manganese from raw water (28).

Culture of water from different sources was showed approximately (90%) growth of *E. coli* colonies, which is a certain indicator of transmission of *E. coli* to [gastrointestinal tract (GIT)] and causing diarrhea. General stool examination of samples showed that *E. coli* which was the first organism in addition to *G. lamblia.*

Giardia is a microscopic parasite is also known as *G. intestinalis*, *G. lamblia*, or *G. duodenalis.* It is found on surfaces or in soil, food, or water that has been contaminated with feces from infected humans or animals, it causes giardiasis disease, which consists about (60-90%) of the diarrheal illness. Giardia cysts can thrive in cold water for months, it is protected by an outer shell that allows it to survive outside the body for long periods of time and makes it tolerant to chlorine disinfection. While the parasite can be spread in different ways, water (drinking water and recreational water) is the most common method of transmission (29), and *E. hitolytica* is a protozoan parasite, and etiologic agent of amoebiasis diseases ,also is a major problem in developing countries because of inadequate sanitation and contaminated food and drinking water (30), and other microorganisms which are caused diarrhea. Children who need more fluids in relation to body weight than older children and adults, are particularly vulnerable to health hazards caused by water pollution (31). Adults need half as much water as infants depending on the amount of exercise, heat loss, illness, food, safe water and electricity have yet to be restored to pre-war levels (32), that means amount of *E. coli* and other microorganisms entering GIT in children is more than in adults which lead to appearance of diarrhea in children under 5 more than in adults.

Conclusion

Majorities of water samples from different sources have a low concentration or absent from chlorine and its benefits, also the food in this area is contaminated with *E. coli ,G.lamblia,* and the giardia cysts can thrive in cold water for months,because it is protected by an outer shell that allows it to survive outside the body for long periods of time and makes it tolerant to chlorine disinfection. While the parasite can be spread in different ways, water (drinking water and recreational water) is the most common method of transmission (29) .

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