Enteric bacterial and parasitic pathogens associated with acute diarrhea isolate from patient in Al-Najaf province

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Angham Najah Al-Khafaji

Enteric Bacterial and Parasitic Pathogens Associated with Acute Diarrhea Isolate from Patient in Al-Najaf Province

Angham Najah Al-Khafaji[a)]

Kufa Technical Institute, Al-Furat Al-Awsat Technical University,Najaf, Iraq

[a)]Corresponding author: kin.angh22@atu.edu.iq

Abstract. The present study aims to isolate and know the ratio of bacterial and parasitic dysentery with age and sex of patients in AL-Najaf province, A cross-sectional research was carried out from January 2020 to January 2021. Ninety people with probable amoebic dysentery were enrolled in the study from different age from Al- Manathera Hospital in Al-Najaf province, People who have diarrhea and are assumed to have dysentery had their stool samples taken. , The diarrheal stool specimen were put into sterile, transparent wide mouthed bottles. The name, age and sex of the patients were properly labeled on the universal bottles. and refrigerated immediately. The results had shown most common bacteria and parasite infections were seen in patients aged 10 to 19, and male having the highest ratio compared to female, Diarrhoeagenic bacteria have high incidence from intestinal parasites infection in this study, *Entamoeba histolytica* infection was the highest in current study. Escherichia coli, Salmonella sp, *Shigella* sp were the predominate bacteria.

Keywords. Diarrhea, bacteria, parasite, viatek 2 compact system.

INTRODUCTION

Diarrhea is identified by the existence of at least three loose, liquid, or watery bowel movements daily. It usually lasts a few days and might cause dehydration as a result of fluid loss. Dehydration symptoms often begin with a lack of typical skin stretchiness and irritating behavior. As the symptoms worsen, this might lead to reduced urine, Skin discoloration, a quick heartbeat, and moreover, a decrease in responsiveness. However, loose but non-watery feces are common in exclusively breastfed infants. The most common cause is an infection of the intestines due to either a virus, bacterium, or parasite condition also known as gastroenteritis. These infections are often acquired from food or water that has been contaminated by feces, or directly from another person who is infected. Diarrhea may be classified into three types: transient watery diarrhea, transient bloody diarrhea, and chronic diarrhea (a condition that lasts more than two weeks and can be both watery or bloody). Watery diarrhea with a limited duration may be caused by cholera. however, this is uncommon in developed countries. It is also called dysentery if the blood is present (1). *Shigellae* is a very well-known cause of acute gastroenteritis, which can also induce extra intestinal symptoms in some situations. *Shigella* infection has long been a significant worldwide public health threat, especially in developing countries. They are a major source of morbidity and mortality in children. Because of the lower infectious dose (10–100 organisms), *Shigellae* was regarded as highly infectious (2).

Antibiotic therapy of common bacterial infections is critical in lowering illness mortality and prevalence. However, drug resistance increases when antibiotics are used inappropriately or extensively to treat diarrhea. *Shigella* spp is resistant to the spectrum of antibiotics treating them is costly, time-consuming, and sometimes difficult, especially in areas where medical treatment is inadequate (3). Despite medical and pharmaceutical advancements, Protozoa and helminthes infections in the intestine are among the most common parasitic infections, and a significant contributor to increased morbidity and death in underdeveloped nations. Despite medical and pharmaceutical advancements, Intestinal parasite diseases remain the most common worldwide, particularly in developing nations, despite advances in sanitary engineering, struggling with a lack of water, a scarcity of adequate health-care services and inadequate hygiene. Additionally, intestinal parasite eradication is challenging in these locations owing because of the high cost of infrastructural development, and the population's lack of educational facilities (4). While some species are considered commensal and non-pathogenic, *E. histolytica* has the potential to do severe harm, life-threatening, and invasive illnesses such as amoebic dysentery and liver abscess (5). The diagnosis of enteric amoebiasis is primarily based on the presence of parasites in the smear, but in the situation of an epidemiological complication caused by *E. histolytica* in the presence of other amoebic species or enteric parasites,

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the claimed infection can only be fully realized if an effective approach exists to distinguish the targeted species from all other closely related organisms. (6).
We evaluated isolated bacterial and parasitic pathogens in this research by patient age and sex, as well as an isolation area. This paper will be beneficial in preventing diarrhea and enhancing the public health care system.

MATERIALS AND METHODS

Study Population

A cross-sectional study was carried out from January 2021 to January 2022 and enrolled Ninety suspected cases of amoebic dysentery of different ages, who attended the Al- Manathera Hospital in Al-Najaf province.

Specimen Collection

A total of Ninety stool specimens were obtained from diarrhea patients, and clinical suspicion of dysentery who were not receiving daily antibiotic therapy. The diarrheal stool specimens were placed in sterile, clear vials with a wide aperture. The patients' names, ages, and sexes were appropriately labeled on the universal bottles, which were promptly chilled.

Parasitological and Bacteriological Procedures

Immediately after collecting the stool specimen, a part of it was examined microscopically for *Entamoeba histolytica* trophozoites or cysts (7). The remaining stool specimens were sent to the bacteriology laboratory in a Cary Blair transport medium for culture. Three distinct media and an enrichment medium were employed to isolate *E.coli, Enterobacter* sp, *Shigella*, and *Salmonella* species optimally. Stool samples were inoculated onto a surface of MacConkey (MAC) agar, xylose-lysine deoxycholate (XLD) agar, and salmonella-shigella (SS) agar then incubated for 24 hours at 37°C according to standard procedures (8).

GN-ID with VITEK-2 Compact

The biochemical test and antibiotics were confirmed using the Vitek 2 System; the assay was carried out according to the manufacturer's instructions. A lope completely isolated colony was inoculated with three milliliters of normal saline within a plane test tube. McFarland's standard solution (1.5 x 108 cells/ml) was used to standardize the colony. In a dens check system, place the test tube. The sample identification number was input into the software program using a barcode, and the identical inoculums were loaded on the cassette. The kind of VITEK2 card was then identified using a barcode affixed to the card during manufacture, and the card was therefore linked to the sample ID number. After that, the tape was inserted into the filler module. The cassette was transferred to the reader/incubator module when it was full. All subsequent measures, such as temperature control, optical card reading, continuous monitoring, and data transfer to the machine for processing, were handled by the device (9). Enteric bacterial infections were discovered utilizing automated equipment after culturing stool specimens from the patient (Vitek2 compact system).

Serotyping

If the isolated bacteria were detected as *E.coli, Enterobacter* species, *Shigella* species, or *Salmonella* species, according to the manufacturer's instructions (Joongkyeom Co., Korea).

STATISTICAL ANALYSIS

The SPSS 23 statistical program was used to analyse the data collected (IBM, Seoul, Korea). For statistical analysis, a significance level of $p < 0.05$ was used.

RESULTS

The current study revealed a high infection ratio in male represent 51.11%, while female 48.89%, with significance $P< 0.05$, as show in figure 1.

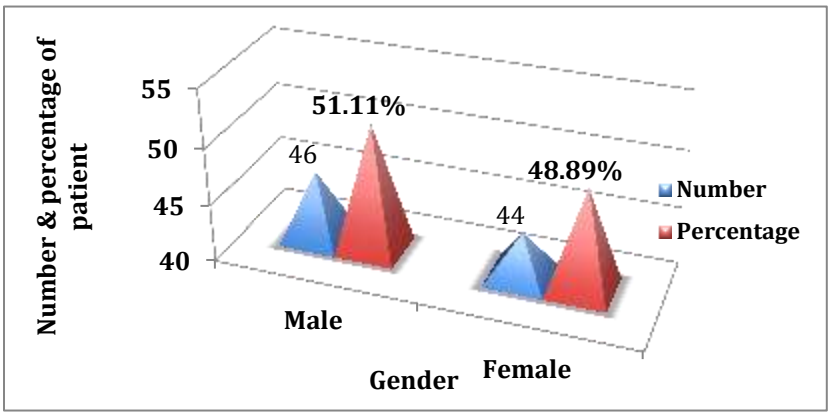

FIGURE 1. Distribution of diarrhea case according to gender

Table 1 shows distribution of patient according to age in Al- Manathera Hospital in Al-Najaf province. Out of the 90 specimen examined. The age group had the highest incidence was from f 10-19 year represent 24.44%, while the lowest incidence occurred in the age group of 70-79 year represent 2.22%, with significance P< 0.05.

TABLE 1. Distribution of dysentery case according to age

Age group	No. of specimen examined	Percentage%
1-9 month	3	3.33%
1-9 year	21	23.33%
10-19	22	24.44%
20-29	10	11.11%
30-39	4	4.44%
40-49	14	15.56%
50-59	8	8.89%
60-69	6	6.67%
70-79	2	2.22%
Total	90	100.00%

These results show that the isolated specimen, 60% pathogenic microorganisms were isolated from Rural patients and 30% Urban patients with significance P< 0.05. As shown in figure 2.

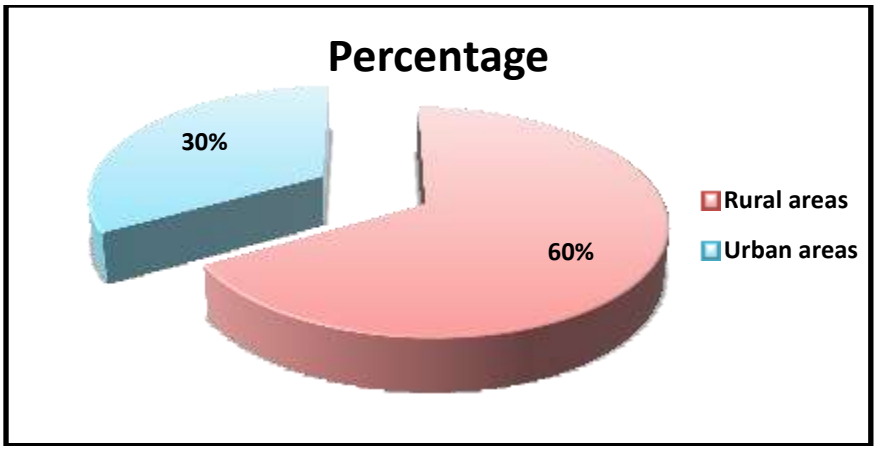

FIGURE 2. Distribution of diarrhea case dependingon the nature of the area

Intestinal parasites were found in 35 of the specimen, *Entamoebahistolytica*were the most common organisms found in diarrheal stool specimen represent 20 (57.14%), followed by *Entamoebahistolytica*11 (31.43%) and other genus 4 (11.43%). As show in figure 3.

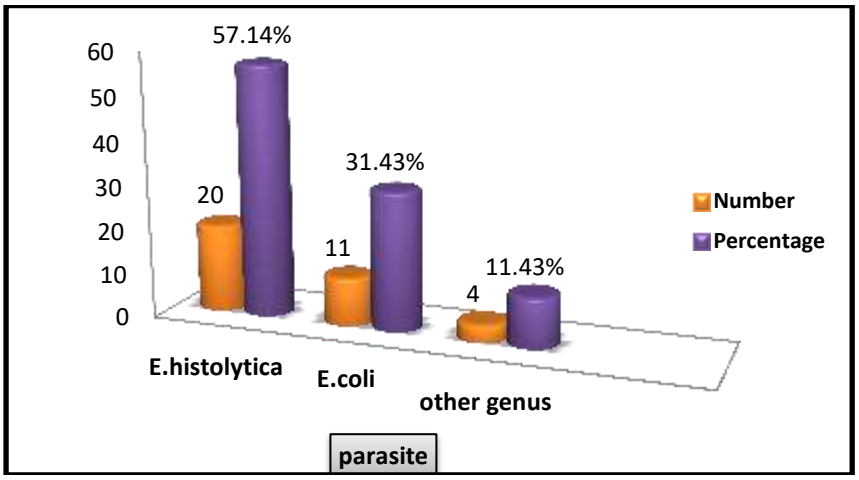

FIGURE 3. Occurrence of parasite isolates in diarrhea stool specimen

figure 4 shows the occurrence of bacteria associated with dysentery in the study subjects with *Salmonella* sp having highest frequency of occurrence of 31 (56.36%) followed by *Shigella*sp 12 (21.82%), *Escherichia coli* with 12 (21.82%).

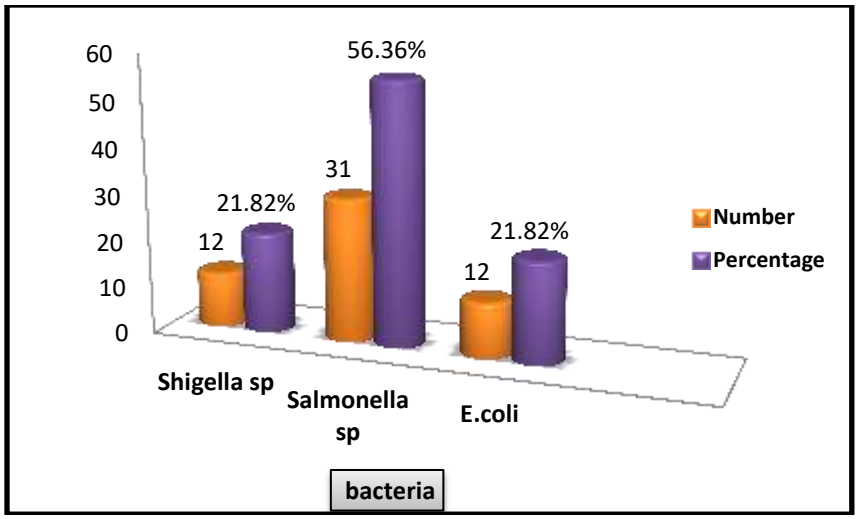

FIGURE 4. Occurrence of bacteria isolates in diarrhea stool specimen

DISCUSSION

The reason of different rate of infection between sexes may be due to the presence of several factors contributing to the difference in incidence between the sexes, including exposure to pollutants and social behavior and the environment (10). This result was in not agreement with (11).In general, the cause of diarrhea in children may be related to a variety of factors, but one of the most common causes is bacteria such as *Salmonella* spp., *vibrio*, and *Escherichiacoli* (12) .The peak of infection with Entero Pathogenic *Escherichia coli* (EPEC) and rotavirus infections occurred within the first year of life, and decrease with age, but *Salmonella* spp infection rates rise with age. Watery diarrhea in children has been related to EPEC, *Salmonella* spp, and *Campylobacter* spp., while *Shigella*spp was associated with bloody diarrhea (13). A variety of causes, including fast economic growth, better water supply systems, improved sanitary facilities, and a growing awareness of the need for cleanliness, may have contributed to the reported reduction (14). Children who were either partially or not at all immunized increased their risk of infectious diarrhea because the lack of immunization left them more vulnerable to infections such as whooping cough and measles. This will have a serious effect on one's health, making them prone to diarrhea and other illnesses (15). These findings suggest that economic growth, which is closely linked to the quality and accessibility of health facilities and healthcare resources, might be one of the key determinants of bacillary dysentery incidence (16).

Factors that enhance transmission and predisposing variables When a young child is not exclusively breastfed, the risk of diarrhea rises during the first four to six months of life. Diarrhea is more common in non-breastfed children than it is in exclusively young infants. Breastfeeding for at least a year or for a prolonged length of time reduces the incidence and severity of diarrhea illness in children (12). Because diarrhea may be caused by a number of organisms, including viruses, parasites, and in some cases, combination illnesses, malnourished children are more prone to diarrhea, which increases their risk of morbidity and mortality (17). There have only been a few such studies with adults who have diarrhea (18). An enteropathogen was found in 38 % of patients with severe diarrhea and 3% of control participants in a town in southern Sweden. These results back up those of a study done in Oana, which covered 23.7 % of the youth in the region. In addition, I accept with the results of (19.(

The variation in diarrheal rates between rural and urban regions might be due to a number of factors, including the family's low quality of life and economic development, both of which contribute to diarrhea's prevalence (20). The presence of domesticated pets in the house increases the risk of diarrhea, particularly when dealing with youngsters (21). Contaminated food and water contribute to disease transmission and serve as a conduit for children (22).

Spread of intestinal parasites in various parts of the world, especially the tropics and subtropics, due to population density in those areas with a lack of spin in the rules of care for the health of their public, as well as the ability of carriers appropriate to the entry and its role in transmitting the disease to spread very quickly. It is believed that the use of human feces as fertilizer organic factors that increase the chances of infection and spread of parasites (23).

While pathogens including *E.coli*, *Salmonella*, and *Shigella* prefer the warmer months (May-August), parasite infection causes diarrhea all year (24).

According to the research results, the overall infection rate with intestinal parasites (44.11 %) is high, owing to the large number of people who suffer from parasitic illnesses as a result of poor sanitation, ineffective public health policies, increased vector populations, and poor nutritional conditions. In addition to the long-term economic embargo in Iraq, which has resulted in a shortage of medication and sanitary supplies (25).

Our results agreed recent data from Iraq and other countries demonstrating that bacterial infections play a significant role in pediatric diarrhea and that the most often found pathogen is an enteropathogenic strain of Escherichia coli (26). *Shigella* species were the most frequently isolated bacterium from patients in Mwanza City who presented with bloody diarrhea. This is consistent with findings from previous research conducted in Africa and Asia (27).

Other studies have the opposit to the current study, as it indicated that the *Salmonella* and *Shigella*are the two most frequency of other bacterial species (28).

CONCLUSION

1. The most common bacteria and parasite infections were seen in patients aged 10 to 19, and male having the highest compared with female.
2. *Diarrhoeagenic bacteria* have high incidence from intestinal parasites infection in this study.
3. *Entamoeba histolytica* infection was the highest in current study.
4. *Escherichia coli*, *Salmonella* sp, *Shigella* sp were the predominate bacteria.

RECOMMENDATIONS

1. Recommend the doctor to depend on bacterial stool culture before giving the drug and using the floatation and sedimentation in parasitic stool examination.

2. Improving personal cleanliness and sanitation practices, as well as water treatment before drinking (boiling or iodine crystal treatment).

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