

Isolation and detection of *Shigella dysenteriae* from patients in Baghdad and Wasit Provinces in Iraq

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Abstract

Diarrhea caused by *Shigella* species was responsible for second causative agent of morbidity and mortality between children in middle and low income east and other countries, in this study 150 stool samples were collected from patients suffering from dysentery in both gender in which attending to Baghdad medical city in Baghdad and Alkarma teaching hospital in Al-Kut/Wasit governorates/Iraq in period between January 2020 to the middle of February 2021 *Shigella dysenteriae* was isolated from 135 of these samples by using cultured methods and other biochemical tests in which routinely used to isolate these bacteria in addition to that in this study detection the dividing of infections with these pathogen in different age groups and seen that mostly infection (51.85%) in age group (1-5) years olds followed with age group(5-10) in which found (31.1%) them (10.37%) in (10-15) and last one 9(6.66) show in (>15) years old age group.

On other hand also antibiotics sensitivity tests was done the results of this research appeared that all isolates was respond to Co-trimoxazole, Cephalotine and Ceftizoxime them Ceftriaxone(98%), Ampicillin(92%), Ceftazidime(90%), Chlormophenicol(84%), Tobramycin(81%), Gentamicin(48%) and the last one was Amikacin(35%) where no isolate appeared any response to Kanamicin.

Keywords: *Shigella*; Detection; Diarrhea; Dysentery

1. Introduction

Diarrhea caused by *Shigella* responsible for most children infection mainly in most Middle East countries [1]. *Shigella* bacteria retain to family Enterobacteriaceae in general these genus was Gram's negative rods non motile include four species *Shigella dysenteriae*, *Shigella boydii*, *Shigella sonnei* and *Shigella flexneri* were considered as highly causing of infections in this genus due to low infectious dose of them 10-200 pathogen/ml, *Shigella dysenteriae* in general was highly caused of infections in however low inoculums could be occurred infection and they are strongly related with dysentery specially in children the world health organization[WHO] recommended to use of azithromycin or ciprofloxacin for treated of pediatric cases[2]. *Shigella dysenteriae* was only one species of this genus have ability to produce shiga toxin in which the causative agent of systemic hemolytic uremic syndrome which commonly infected children and may be fatal in some time [3]. Quickly diagnosis of dysentery and hemolytic uremic syndrome which lead to early treatment of them and decrease risks of hemolytic uremic syndrome and its complications [4, 5].

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2. Material and methods

2.1. Sample

The study included 150 stool samples were taken randomly in sterilize screw capped bottles from both genders with different age groups attending to Baghdad medical city in Baghdad and Alkarma teaching hospital in Al-Kut/Wasit governorates/ Iraq. All persons don't receive any antimicrobial therapy at least one week before sampling.

2.2. Specimen Collection and Processing

Microbiologically, infection was evaluated by cultured samples directly after collected on different media in which is used for isolation and cultivation of *Shigella dysenteriae* and these included Nutrient agar then after appeared bacterial colony cultured on blood agar base, MacConkey agar, Salmonella-Shigella agar media, Brain heart infusion agar media after that microscopic examination was done. Stool samples was collected and cultured immediately after collection this work was done during beginning of January 2020 to the middle of February 2021.

Samples were cultured immediately over mentioned media. The plates were incubated at 37°C for 24-48 hours at little aerobic conditions. Only those samples that gave significant growth were considered as infection.

2.3. Identification of the Isolates

Many biochemical tests were done amino acids decarboxylation, carbohydrate fermentation, IMVIC tests (Indole, Methyl red, Vogus-Proskauer, citrate utilization) tests.

2.4. Antibiotic Sensitivity Test

It was carried out using agar diffusion method [6, 7].

3. Results and discussion

Results of these study refers that 135 isolates of *Shigella dysenteriae* out of 150 total stool samples, in this research found spreaded of these infections in different age groups as follow: 70(51.85%) in age group (1-5) years olds followed with age group(5-10)years old in which found 42(31.1%) them 14(10.37%) and 9(6.66%) in age groups (10-15) and (>15) years old respectively as show in Table 1, these results was agree with data research in which obtain by(2) in India and (3) in Iraq, other ways this study seen that most infections appeared in (1-5) age group these may be related to that patients in child period in this age had poor personal hygiene in addition to that low percentage infection in adults and elders ages may associated with acquired immunity from recurrent infections with this pathogen.

Table 1 Distribution of *Shigella dysenteriae* according to the age groups

Age group	<i>S. dysenteriae</i>
1-5	70(51.85%)
5-10	42(31.1%)
10-15	14(10.37%)
>15	9(6.66%)

Also in this study found that infection incidence with this pathogen in female was 63% compared with 37% in male and these results was accepted with (5) in which found that these percentage was 60% and 40% in female and male respectively and these results may related to female biology and also may associated with female working in which dealing with house and bathroom cleaning as show in Figure 1.

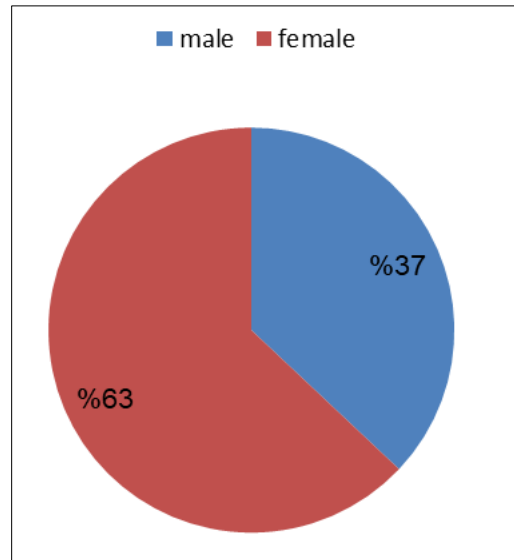


Figure 1 Distribution of *Shigella dysenteriae* in males and females

The antibiotics sensitivity test was done appeared that all isolates 135(100) respond to Co-trimoxazole, Cephalotine and Ceftizoxime them Ceftriaxone 132(98%), Ampicillin 124(92%), Ceftazidime 122(90%), Chlormophenicol 113(84%), Tobramycin 109(81%), Gentamicin 64(48%) and the last one was Amikacin 47(35%) whereas no isolates appeared any response to Kanamicin Table 2, these results were agree with data obtained by (8) in which same results.

Table 2 Antibiotics sensitivity tests to *Shigella dysenteriae*

Antibiotic name	No. of positive respond	Percentage %
Chlormophenicol	113	84
Nalidixic acid	54	40
Tobramycin	109	81
Gentamicin	64	48
Amikacin	47	35
Kanamicin	-	-
Ampicillin	124	92
Co-trimoxazole	135	100
Cephalotine	135	100
Ceftizoxime	135	100
Ceftazidime	122	90
Ceftriaxone	132	98

4. Conclusion

Diarrhea caused by *Shigella* species was responsible for second causative agent of morbidity and mortality between children in middle and low income east and other countries. *Shigella* bacteria retain to family Enterobacteriaceae in general these genus was Gram's negative rods non motile include four species *Shigella dysenteriae*, *Shigella boydii*, *Shigella sonnei* and *Shigella flexneri* were considered as highly causing of infections in this genus due to low infectious dose of them 10-200 pathogen/ml, *Shigella dysenteriae* in general was highly caused of infections in however low inoculums could be occurred infection and they are strongly related with dysentery specially in children the world health organization[WHO] recommended to use of azithromycin or ciprofloxacin for treated of pediatric cases.

Compliance with ethical standards

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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