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Urinary Tract Infection in Kerbala Governorate Children, Causes and Influencing Factors

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Abstract

Urinary tract infections (UTI) is one of the most frequent types of bacterial infection in humans; children are not an exemption, UTI is so common among young ages; it caused by pathological germs (kidneys, bladder, urethra, prostate). It is one of the significant difficulties facing the health sector in third-world nations, affecting children of all ages. UTI is are one of the severe problems that place a financial burden on the healthcare system, as the number of incidents worldwide might exceed 150 million in a single year, and infants and children are more prone to the disease's risks.

This study was conducted on (1334) children (males 611/ 45.8%, females723/54.2%) between the ages of one day - 12 years who visited Karbala governorate hospitals and some children's clinics in the governorate to determine whether the injuries are related to the months of the year, the environment, the parent's educational level and if females or males are more affected. The number of samples that gave positive results was 525(66.62%), and the number of negative samples was 263(33.38%). This study showed that the highest percentage of positive samples was recorded in January 54(10.29%), and the lowest rate of infection was recorded on April 36 (6.86%). This study found significant differences in the distribution of disease cases between residents of the rural environment 356 (69.13% and residents of the urban environment 169(61.9%). The educational level of the parents directly and significantly affects urinary tract infections in children. The highest incidence of urinary tract infection was in school-aged 143 (27,24%). The lowest incidence was in newborns, 42(8.0%) among all gender. The study showed significant differences (0.05) in the distribution of injuries between males and females between different age groups, where the highest injury was recorded among females school-aged 102 (33.77%).

Introduction

Urinary tract infections are one of the most common diseases, and they are caused by infection of the urinary system with pathological germs (kidneys, bladder, urethra, prostate)(8). UTIs is a dangerous disease that affects a wide range of people, children of all ages in particular, and it is one of the severe challenges that the health field suffers from in third world countries (1, 5). UTIs are one of the severe problems that cause a material burden on the health sector. The number of injuries in the world may reach 150 million injuries in one year, and infants and children are more vulnerable to risks from this disease (10). 10% of children with a fever have symptoms of urinary tract infection, and this percentage may increase based on the living conditions surrounding the children (age, gender, nutrition, parents' cultural attribution, male circumcision)(11). While (7) indicated that 2-20% of the causes of fever in children is urinary tract infection. The absence of clear and specific clinical symptoms in infants and young children makes the process of diagnosing UTIs in most cases not accurately diagnosed (6) about 50% of pediatric UTIs are missing (15), The lack of an accurate diagnosis of a UTI infection And the absence of targeted treatment leads to future severe complications, including sepsis and meningitis(4), in addition to long-term complications such as kidney scarring, hypertension and chronic renal failure (13) In most cases, experimental antibiotics are prescribed before antibiotic sensitivity test, and this leads to an increase antibiotic resistance bacteria UTIs (12).

Urinary tract infection is defined as an invasion and bacterial proliferation in one part of the urinary system, and the severity of the infection depends on the amount of bacterial colonies (9); it is usually classified according to the site of bacterial invasion in the urinary system (pyelonephritis), (cystitis) and (bacteriuria)(16).

The epidemiology of urinary tract infection in children depends directly on the age of infancy, sex, and the state of closure in males, nutrition and other social factors, as the rate of infection of males is higher than that of females during the first year of life and most of it in the first three months, while the rate of infection of females rises between the ages of 3-12 Years(2).

Materials And Methods:

This study was conducted on (1334) children (males 611/ 45.8%, females723/54.2%) between the ages of one day - 12 years who visited Karbala governorate hospitals and some children's clinics the governorate. Patients with a history of fever> 38 ° C in addition to the availability of evidence of one or more symptoms expected to be a urinary tract infection (such as dysuria, frequency, urgency, recurrence, small spaces, abdominal pain and vomiting) and in some cases the absence obvious disease symptoms other than the unexplained high temperature in addition to the growth of> 105 CFU / ml in urine cultures, other data were obtained through medical files and laboratory information, after obtaining the consent of the patient's family.

Urine samples (5-10 ml) were collected by clean catch mid-stream collection in children who were trained to use the toilet, used adhesive urine collection bags in young children not trained using the toilet, in both cases, the genitals were cleaned before the urine sample was collected in order to reduce contamination to a minimum. The samples were collected in clean cups and were submitted for urinalysis and bacterial culture .

Dipstick test: A fresh and uncentrifuged urine sample was examined directly using urine dipstick to check for nitrite and leucocyte esterase in the urine sample. The change in the detector from colourless to pink indicates nitrite positive. The change of the leukocyte esterase detector from off-white to purple is a sign of Leukocyte esterase positive (14). Microscopical examination: the sample was placed in a centrifuge for Microscopical examination of the sample for investigation Frequency of presence of pus, bacteria, epithelial cells, crystal, mucus, and red blood cells under. Standard microbiological techniques identified bacterial isolates, and the diagnosis confirmed by using biochemical tests and an API system.

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Table (1) The number of samples and the of positive culture, negativeculture and non-culture bacterial growth

rate non culture	non cultuer	rate negative	urin culture negative	rate positive	urin culture positive	sample
8.47%	113	32%	433	59.07%	788	1334

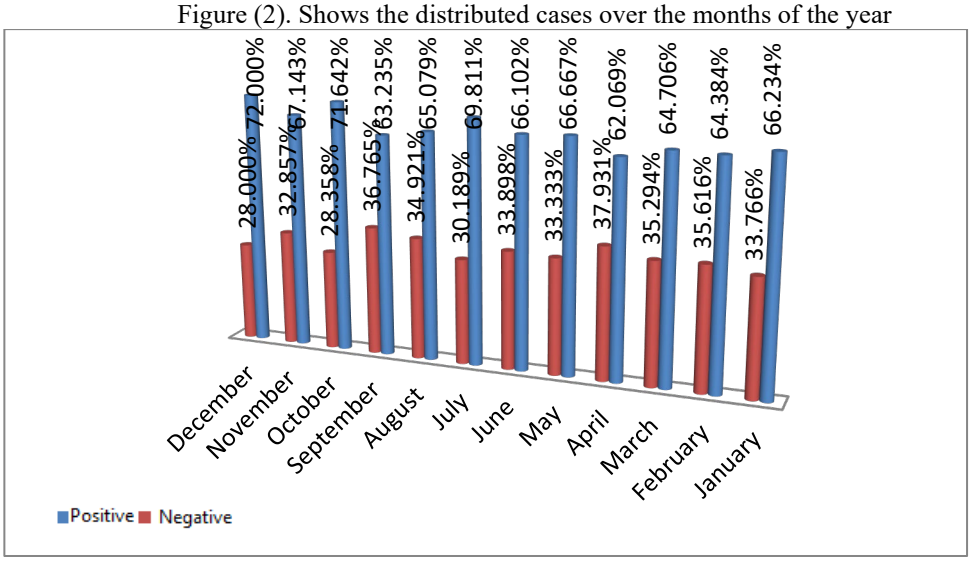
The sensitivity to the antibiotics was determined as no sensitive; moderate sensitivity; resistant; and sensitive. For determination of antibiotic susceptibility, a modified Kirby–Bauer disc diffusion test was used against the following antibiotics, which were placed on the culture (MHA plates): gentamycin; trimethoprim; amoxicillin; amikacin; nitrofurantoin; cephalothin; ceftriaxone; ampicillin; cefotaxime; cefixime; vancomycin; Azethromicin; and carbenicillin. (3).

Results

During the one year of this study, from January to the end of December of 2019, 688 urine samples were collected from children suspected of having urinary tract infection, depending on the accompanying clinical symptoms and other microscopic examinations and through routine tests to diagnose pathogenic bacteria. The number of samples that gave positive results was 525(66.62%), and the number of negative samples was 263(33.38%). The positive results were divided into 223(29.5%) males and 565(71.7%) female

Stastistical analysis showed that the months of the year did not affect the number of recorded urinary tract infections. The injuries were distributed over the months of the year, and the highest percentage of positive samples was recorded in January 54(10.29%). The lowest rate of infection was recorded on April 36 (6.86%)of the total positive infection cases(Table 2**).**

Figure (2). Shows the distributed cases over the months of the year



This study found significant differences in the distribution of disease cases between residents of the rural environment 356(69.13% and residents of the urban environment 169(61.9%) (Table 3).

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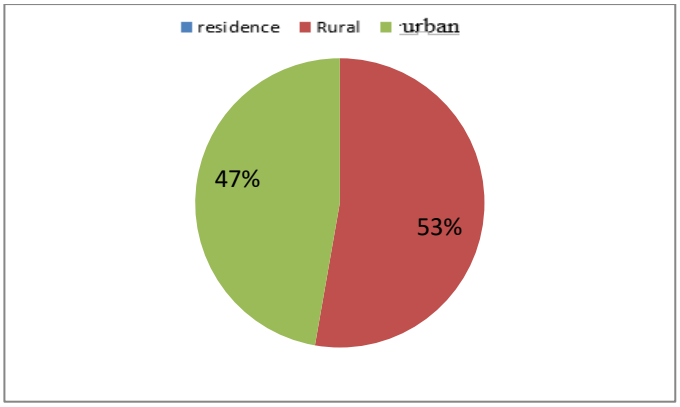

Figure (2). Shows the distributed cases over the rural and urban areas

The study also found that the educational level of the parents directly and significantly affects the incidence of urinary tract infection in children(table:2, 3).

Table (2,3). Shows the educational level of the patients parents

	Frequency	Percentage
Educational status of father		
Unable to read and write	133	25.33%
Primary	119	22.67%
medium	112	21.33%
High school	84	16.00%
College and above	77	14.67%
Total	525	100.00%
Educational status of mather		
Unable to read and write	139	26.48%
Primary	126	24.00%
medium	102	19.43%
High school	85	16.19%
College and above	73	13.90%
Total	525	100.00%

This study showed that the highest incidence of urinary tract infection was in school-aged 143 (27,24%) for and the lowest incidence was in newborns 42(8.0%) of all gender.
The study showed significant differences (0.05) in the distribution of injuries between males and females between different age groups, where the highest injury was recorded among females school-aged 102(33.77%) and the lowest infection in newborns 19 (6.29%). As for males, the highest infected in infants 60(25.75%) and the least infected in newborns 23(9.87%) (table:4)

The high temperature is a characteristic clinical symptom of urinary tract infection, and for all ages, compared to other clinical symptoms, There is also no specific correlation between the onset of clinical symptoms and the sex of the affected person in all age groups (table:5)

In the study, a microscopic diuretic examination of urine samples was performed as one of the approved tests for the initial and rapid diagnosis of urinary tract infection. The study showed that there was a significant relationship between the positive results of urine dipstick, rapid laboratory tests, which were nitrite, leukocyte esterase test, direct microscope and the positive results of urine

culture at a significant level (0.01) as well as the negative results of the tests were statistically correlated with the negative results of urine transplantation(table:6) the urine dipstick for nitrite alone was Sensitivity 62.66% and specificity 83.27% respectively with a highly significant p-value of 0.000001, when compared to urine culture generating, PPV 88.2% and NPV 52.77%. Urine dipstick for leukocyte esterase alone was sensitivity 80.57% and specificity 81.37% respectively with a highly significant p-value of 0.000001, compared to urine culture generating, PPV 83.1% and NPV 63.44%.

The sensitivity and specificity of urine microscopy were 89.33% and 83.27%, respectively, compared to urine culture with a p-value of 0.018, generating a PPV and NPV of 91.42% and 79.63%, respectively(17).

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