

# Isolation of E – Coli in UTI cases with Malnutrition in Children of Distant Rural Area of Sukkur, Sindh

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## ABSTRACT

**Introduction:** A cross-sectional study of isolation of Escherichia coli in urine culture of children and its correlation to childhood malnutrition induce microcytic hypochromic anaemia (I.D.A).

**Study Design:** Cross Sectional Study

**Place and Duration of Study:** This study was carried out at the Biochemistry Department, GMMC, Sukkur from 01.12.2011 to 31.05.2013.

**Materials and Methods:** Study was carry out among the children under 05 (five) years of age. Number of children included in this study was 150. Structured questionnaire were use to obtain the required data. Laboratory investigation of blood, urine samples was performing by standard methods and anthropometric data also collected.

**Results:** The results showed that Escherichia coli positive children are 64.0 %, 60.5% Childs has extremely low body weight, 43.6 % shows stunting and 21.7 % was wasting.

**Conclusion:** This study showed that there is correlation between Urinary tract infection and malnutrition. So, energy yielding nutrients containing 8 – 10 essential amino acids, fates and minerals may be supplemented to less privileged patients of remote rural area of sukkur to enhance immune status.

**Key Words:** UTI, E – Coli infection, Protein Malnutrition, Iron deficiency anaemia

## INTRODUCTION

Escherichia coli (E. coli) also include the organisms that were formerly known as the enterobacteriae group. E. coli (Gram negative bacillus) has been recognized as the most prevalent facultative pathogen of Urinary tract infection (U.T.I).<sup>1,2,3</sup> They found in human as microbial flora of large intestinal tract. U.T.I is the most common bacterial infection and in tropical countries children less than five (05) years of age are frequently infected than adults<sup>4</sup>. Common urinary pathogens are E. coli, Pseudomonas aeruginosa, Proteus species, Klebsiella strains, Enterococci and Staphylococcus Saprophyticus. In the developed countries, it has been implicated that E. coli as a cause of U.T.I specially in children but in developing countries, however E. coli is endemic and a predictor of protein deficiency (Protein malnutrition) in children under 05 years of age.<sup>4,5,6</sup> Urinary infection with E. coli specie including cystitis, and pyelonephritis but most often the infections are asymptomatic. Usually patients with cystitis are commonest in E. coli infection. Chronic U.T.I patients by E. coli are associated with clinical manifestation of loss of appetite, weight loss, decrease BMI, stunted growth and anaemia. Skins of the patients become dry and scaly<sup>7,8,9</sup>. The association of E. coli with malnutrition induced iron deficiency anaemia has been reported in few studies. In addition, a positive association between Escherichia coli with

malnutrition has been described before. Clinically E. coli causes malnutrition and can lead to iron deficiency anaemia is not reported.<sup>10,11</sup> Children with E. coli are treated by the antibiotics without energy yielding nutrients. Therefore, immune status of patients lowered so they are not cure.<sup>12,13,14,15</sup>

## MATERIALS AND METHODS

In present study, total 150 children were recruited who were less than 05 years of age.

**Statistical analysis:** Statistical data were expressed as mean and  $\pm$  standard deviation (STD). Using student's t- test or analysis of variance compared mean of two groups<sup>16</sup>. The results were considered statistically significant the  $p$ -value was less than 0.001. Data were analyzed by the Statistical package for Social Science version 12.0 (SPSS inc, Chicago, IL, USA).

**Study areas and population:** This is part of a cross-sectional study on the relationship between U.T.I and iron deficiency in population of sindh, Pakistan. The children included in this study, belong to the low socio-economic growth. The people of this area pertaining to labor and farmer class. The houses of these people are built of mud usually. Some of them built house with bricks without cement plaster. They do not have access to safe drinking water, and unprivileged sanitary facility. Majority of children included in this study are belonging to the remote area of sindh. All the children agreed voluntarily through concealing with their parents

were included. Majority of children has not proper knowledge for personal hygiene. Total 150 children were included in this study, out of these 138 children provided sample for analysis. The children are included in this study belong to both gender. Proper information about the collection of sample was given to the children's mothers who were not completely aware about the personal hygiene. The data were collected using a questionnaire, anthropometry, and laboratory examination of blood and urine specimens.

**Structured questionnaire:** The questionnaire were prepared to collect the data which include the information about the name of patients, age, sex, occupation of parents, address, presenting complaint, brief history of presenting complaint, about the parents socio-economical status, education, how many children they have? And other related inquiry in the direct interviews. Data were collected over a period of 06 months, beginning in December 2011. During many visits, data were data through questionnaire and blood and urine sample le were collected with the permission of parents during multiple visits. Each voluntarily was given a sequential number which is identification number of the child, and particulars were entered in the data sheet accordingly. To insure the age and weight at birth of children we use birth certificate, while immunization status was recorded from child's health record.

**Anthropometric measurements:** All children underwent Anthropometric measurements. Children were weight with minimum clothing using a portable digital weight machine, for height calibrated scale consist of wooden platform with measurement scale and head piece. To reduce error, Wight and height measure precisely. Assessment of malnutrition done on the bases of growth chart for international used maternal child and health care 1978 (WHO Geneva). Patient's weight for age less then 60 % of standard chart considered as malnourished. Sever malnutrition counted when child weight for age less then 70 % or individual has mid upper arm circumference less then 12.5 cm.

**Blood examination:** Blood sample was collected as aseptically as possible, using a pressure cuff; locate a suitable vein in arm. 05 ml blood was collected and divided into two portions. 2 ml blood were transferred into a tube containing ethylene diamine tetra-acetic acid (E.D.T.A) for heamatological analysis and remaining blood were transferred to gel tube (allow to collect without any heamolysis) for biochemical analysis. Blood serum (which was obtained through the centrifugation of clotted blood) was used to analyze total blood protein, serum albumin, blood urea level, and blood creatinine level by a semi automatic spectrometric machine. E.D.T.A blood sample were used to analyze for complete blood count

(Heamoglobin, R.B.Cs count, Blood indices, TLC, DLC, Platelets counts).

**Urine culture examination:** A sterile two container used. One container containg boric acid

The urinary tract is normally sterile except for the urethra which may contain a few commensale such as *Acinetobacter* spp: and *Diphtheroids*. Yeasts may also be found in the female urethra. Contamination of the urine with skin commensals including *Staphylococci*, *Diphtheroids*, and *Mycobacterium smegmatis* may occur as a specimen is being collected. With female children, the urine may become contaminated with organisms from the vagina. Vaginal contamination is often indicated by the presence of epithelial cells (moderate to many) and a mixed bacterial flora. For collection of proper urine sample of children, complete information was given to the mothers of children and explains the importance of collection a specimen. Female child's mothers are instructed to collect the specimen with clean-catch method. A sterile, dry, wide-necked, leak-proof container with boric acid (10 g/l) is provided to each participant. Whenever possible, the first urine passed by the Childs was collect. Some time immediate delivery to the laboratory is not possible, the urine sample were ice packed till refrigerated at 4 °C. When sample reached to the laboratory, it was examine. Urine of each child was analyzing microscopically and culture. For culture, cystine lactose electrolyte-deficient (CLED) media were used. Inoculated plates were incubating at 35 – 37 °C aerobically for 24 hours. urine were analysis for urinary protein by 20 % sulphosalicylic acid method and nitrate test with multistrips method. this is based on the ability of gram negative organisms to reduce nitrate to nitrite, indicating the presence of gram –ve enteric organism. Microscopic examination of centrifuged deposit done for the presence of red blood cells, pus cells, cast within 2 hours.

## RESULTS

Total 150 children were participate in this study, out of the 67 were male and 88 were female under five years of age. Mean age of children were  $3.110 \pm 1.930$  years. Among the 150 children 69.0 % children were significantly under weight, 29.2 % were normal, and 1.8 % were over weight. Serum total proteins and albumin was recorded in g/l and less then 3.9 g/l and 1.9 g/l were considered as hypoproteinaemia and hypoalbuminaemia respectively. Analysis of data of this study shows the mean serum total protein level is  $3.7 \pm 0.2$  g/dl while serum albumin mean is  $1.6 \pm 0.9$  g/dl. Results of blood urea and blood creatinine were absolutely normal. Table number 01 shows the results of *E. coli* infection and its frequency while table number 4 shows the results of heamatological findings of children included in this study.

**Table No.1: Comparison of frequency and % of E.Coli infection with all others in different age groups**

Age (years)	No. of Children Examined	No. of E.Coli Infection
Up to 1 years	24 (16.0 %)	16 (10.7 %)
1 – 2 years	36 (24.0 %)	19 (12.7 %)
2 – 3 years	34 (22.6 %)	27 (18.0 %)
3 – 4 years	30 (20.0 %)	19 (12.7 %)
4 – 5 years	26 (17.3 %)	15 (10.0 %)
Total No.	n = 150	96 (64.0 %)

**Table No. 2: Frequency and % of males and females children**

No. of E.Coli Infection	No. of Males child infected	No. of females child Infected
Total n = 96	n = 29 (30.2 %)	n = 67 (69.8 %)

**Table No. 3: Biochemical findings of patients**

Test	Mean $\pm$ SD (n = 136)	Reference values
Total Protein (g/dl)	3.7 $\pm$ 0.2	5.5 – 8.5 g/l
Albumin (g/dl)	1.6 $\pm$ 0.9	3.5 – 5.0 g/l
Urea (mg/dl)	24.14 $\pm$ 6.09	10 – 50 mg/dl
Creatine (mg %)	0.48 $\pm$ 0.11	0 – 1.0 mg/dl

**Table No. 4: Hematological finding of children**

Test	Mean $\pm$ SD	Reference values
Hb(g/dl)	7.2 $\pm$ 1.9	12.0 $\pm$ 2.0
RBCs (Cmm)	2.8 $\pm$ 1.3	4.7 $\pm$ 0.7
Hct (%)	24.7 $\pm$ 10.7	41.0 $\pm$ 4.0
MCV (fl)	63.4 $\pm$ 22.6	84.0 $\pm$ 7.0
MCH (dg)	21.3 $\pm$ 1.2	29.5 $\pm$ 20.5
MCHC (g/dl)	25.4 $\pm$ 3.2	33.0 $\pm$ 2.0

## DISCUSSION

The classical definition of significant bacteriuria ( $> 10^5$  cfu of bacteria/ml in a mid stream urine sample) is still applied in childhood with the proviso that any bacteriology reports should always be interpreted in the clinical context<sup>17,18,19</sup>. Urinary tract infections are infection of the urethra, bladder, ureter or the kidney. In our study, far-off area of Sukkur usually with clinical feature of anaemia, low body weight and stunted growth. Nails of some children are brittle and spooned nail<sup>20,21,22</sup>. On laboratory investigation of urine culture specimen, we observed that 64 % children were positive with E. coli and have U.T.I. It is also reported that E. coli are responsible for at least 80 % of urinary tract infection<sup>23,24,25</sup>. With positive results of urinary tract infection, we also observed the significantly low values of Total protein ( $3.7 \pm 0.2$  g/l) and albumin ( $1.6 \pm 0.9$  g/l) while results of blood urea ( $24.14 \pm 6.09$  mg/dl) and creatinine ( $0.48 \pm 0.11$  mg/dl) shows the normal functioning of kidneys. Results of haematological investigation reveal that 79 % children

were suffering from iron deficiency anaemia due to haemoglobin or blood loss. Hemoglobin was decrease then the normal values according to the age and sex. All the indices include Hct, MCV, MCH, MCHC was also decrease then the reference normal values, which predicate the presence of microcytic hypochromic anaemia (Iron deficiency anaemia). On blood smear, we also observed the morphology of RBCs which anisocytosis/poikilocytosis, microcytosis (+++), pencil cell. some macrocytosis (+) shows the presence of blood or haemoglobin loss. In this study we observed that the prevalence of urinary tract infection was higher in children aged 2 to 3 years and female child infection frequency was more than male. This may indicate that high rate of transmission of the infection due to the anatomy of urinary tract. According to results of the present study, we observed the association of E. coli with malnutrition.

## CONCLUSION

This study showed that there is correlation between Urinary tract infections by Escherichia coli and malnutrition. A balanced diet with high energy yielding nutrients may be suggested to enhance the immune system to combat the infection.

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