

# Frequency of Urinary Tract Infection (UTI) in Neonates Admitted with Indirect Hyperbilirubinemia

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## ABSTRACT

**Objective:** To determine the frequency of urinary tract infection (UTI) in neonates admitted with indirect hyperbilirubinemia.

**Study Design:** A cross-sectional study.

**Place and Duration of the Study:** Inpatient department of Pediatric Medicine, Bolan Medical College/Hospital Quetta from Jan 2019 to Dec 2020.

**Methodology:** A total of 130 neonates of either gender (delivered at  $\geq 32$  weeks) admitted with primarily complaints of jaundice (with evidence of indirect hyperbilirubinemia) were included. Sex, age, weight and height of all neonates were noted. Serum bilirubin levels were assessed and urine samples were also evaluated for the existence of urinary tract infection (UTI).

**Results:** In a total of 130 neonates, 58 (44.6%) were males and 72 (55.4%) females. The UTI was found to be present in 41 (31.5%) neonates admitted with indirect hyperbilirubinemia. Among these 41 culture proven UTI cases, most common organism was *E. coli* found in 15 (36.6%) cases while *Klebsiella* was the 2<sup>nd</sup> most commonly found microorganism noted in 11 (26.8%) cases.

**Conclusion:** Frequency of UTI was high (31.5%) among asymptomatic jaundiced newborns. Children presenting with jaundice needs to be evaluated for UTI.

**Keywords:** *E. coli*, indirect hyperbilirubinemia, *Klebsiella*, Urinary tract infection (UTI).

## INTRODUCTION

Neonatal jaundice is estimated to affect around 60% of full-term and 80% pre-term neonates<sup>1</sup>. Most cases of neonatal jaundice are because of increased direct fractions of bilirubin whereas 0.1-0.2% cases are found to have cholestatic jaundice<sup>2</sup>. Following the birth, physiological hyperbilirubinemia is the most frequent cause behind neonatal jaundice contributing about 54% of cases<sup>2</sup>. Around 15% of breast-feeding newborns are found to have jaundice lasting beyond 3 weeks<sup>3</sup>. Very few infants are observed to have pathological causes behind jaundice like metabolic, endocrine or hemolytic causes while bacteremia or sepsis can also cause jaundice<sup>4</sup>.

Literature represents gram-negative microorganisms to be involved in most sepsis-related jaundice cases while *E. coli* is considered to be the most commonly involved microorganisms<sup>5</sup>. Infants having structural abnormalities in the urinary tract are found to have increased susceptibility to hyperbilirubinemia which can further be a cause of urinary tract infection (UTI)<sup>5,6</sup>. Endotoxins released by microorganisms could be the main contributing factor behind UTI linked hyperbilirubinemia. Bile stasis because of impairment in the excretions and indirect damage to hepatocytes could be another possible reason behind UTI linked hyperbilirubinemia<sup>2,7,8</sup>.

UTI seems to be an important health issue among children while it is also a frequently presented cause behind febrile illnesses<sup>9</sup>. Timely management of UTI could be very helpful in preventing common complications of UTI like hypertension, end-stage renal disease, urosepsis or proteinuria<sup>9,10</sup>. There is no consensus regarding screening of UTI among asymptomatic neonates coming with jaundice but there is always a suspicion of sepsis or major systemic illness when these cases present in the emergency department. The objective of this study was to determine the frequency of urinary tract infection (UTI) in neonates admitted with indirect hyperbilirubinemia.

## MATERIAL AND METHODS

This cross-sectional study was carried out in the inpatient department of Pediatric Medicine, Bolan Medical College/Hospital Quetta from Jan 2019 to Dec 2020. For the objective of the study, sample size of 130 was calculated by using WHO sample size

calculator with Confidence level (1- $\alpha$ ) is taken as 95%, with desired precision (d) of 7% and approximate population estimation of 21% taken from the parent study<sup>11</sup>.

Patients included in the study were neonates of either gender (delivered at  $\geq 32$  weeks) admitted with primarily complaint of jaundice (with evidence of indirect hyperbilirubinemia). All neonates with age < 32 weeks, neonates having evidence of direct hyperbilirubinemia, babies with chromosomal abnormalities or inborn error of metabolism were excluded from the study.

After getting approval from hospital ethical review committee, all neonates at Bolan Medical College/Hospital (inpatient) who were meeting the inclusion criteria became the part of the study. Then after taking an informed consent by the parents and, Proforma was filled for patient ID number, sex, age, weight, height of all neonates with sign and symptoms suggestive of jaundice. Then while taking other samples of blood, about 2cc sample was taken in green top which was sent to laboratory for serum bilirubin. Simultaneously urine bag was placed after washing the urethra of neonates by sterile water. As soon as baby passed urine, sample was sent to laboratory not later than 30 minutes. Results were analysed by senior resident which again were checked by consultant before putting the data onto Proforma. Afterwards, data analysis procedure was started as soon as required sample data was achieved.

A database was developed on SPSS for windows version 22.0. Mean value and standard deviation was calculated for quantitative variables like age, weight, height and duration of hospitalization. Frequencies with percentages were presented for qualitative variables like gender and UTI (Yes/No). Chi-square test was applied on all categorical variables. Effect modifiers were controlled through stratification of age to see the effect of these on outcome variables. P-values <0.05 was taken as statistically significant.

## RESULTS

In a total of 130 neonates, 58 (44.6%) were males and 72 (55.4%) were females. The mean weight was 2.5 $\pm$ 0.55 kg while the mean height and FOC (fronto occipital circumference) were 46.19 $\pm$ 3.25 cm and 33.23  $\pm$  1.40 cm respectively. Of total 130 neonates, 33 (25.4%) were term neonates. Table-1 is showing characteristics of all neonates studied.

Table-1: Characteristics of Neonates (n=130)

Characteristics		Number (%)
Sex	Male	58 (44.6%)
	Female	72 (55.4%)
Gestational Age	Term	33 (25.4%)
	Pre-Term	97 (74.6%)
Place of Enrollment	Outpatient Department	88 (67.7%)
	Emergency Department	42 (32.3%)

The UTI was found to be present in 41 (31.5%) neonates admitted with indirect hyperbilirubinemia (figure-1).

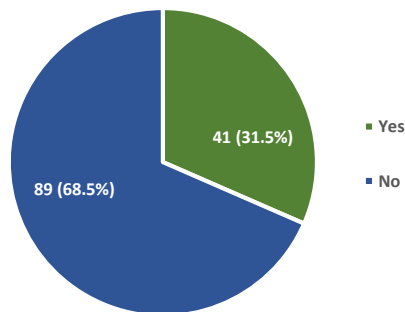


Figure-1: Frequency of UTI in neonates admitted with indirect hyperbilirubinemia (n=130)

Among these 41 culture proven UTI cases, most common organism was *E. coli* found in 15 (36.6%) cases, *Klebsiella* was the 2<sup>nd</sup> most commonly found microorganism noted in 11 (26.8%) cases while *Burkholderia Cepacia* was noted in 8 (19.5%) and *Acinetobacter* in remaining 7 (17.1%).

Table-2 is showing frequency distribution of neonates having UTI with respect to study variables and it was found that no statistically significant association was found with sex ( $p=0.103$ ), gestational age ( $p=0.542$ ) or place of enrollment ( $p=0.087$ ).

Table-2: Frequency Distribution of Neonates having UTI with respect to Study Variables

Study Variables	UTI		P-Value
	Yes (n=41)	No (n=89)	
Sex	Male	14	0.103
	Female	27	
Gestational Age	Term	9	0.542
	Pre-Term	32	
Place of Enrollment	Outpatient Department	32	0.087
	Emergency Department	9	

## DISCUSSION

Incidence of UTI is estimated to be around 2% in the early weeks of life but bacteremia and sepsis are commonly reported problems among neonates that can cause neonatal jaundice<sup>12,13</sup>. In our study the frequency of urinary tract infection (UTI) in neonates admitted with indirect hyperbilirubinemia was found to be 31.5%. Another study noted overall prevalence of UTI in jaundiced neonates to be 11%<sup>14</sup>. Similarly, Erhan et al enrolled patients with neonatal jaundice and searched to find out cause of jaundice. Breastfeeding was the most common cause followed by Rh incompatibility. UTI was diagnosed in 8% of neonates<sup>15</sup>. On the other hand, study conducted by Chamdine Omar et al showed that 21% babies who had jaundice (indirect hyperbilirubinemia)

suffered from UTI<sup>11</sup>. The above results demonstrate that there is strong association between UTI with indirect hyperbilirubinemia.

Moreover, 55% of female were affected in our study. Contrary to this, study conducted by Rashed et al showed that male babies are commonly affected<sup>16</sup>. Though at this early age, it is unclear the association between gender and UTI. Furthermore, term babies are more affected than preterm babies in our study. However, data of some studies illustrates that the incidence of UTI in jaundiced babies is higher in low birth weight and preterm infants as well as febrile or hyperbilirubinemic patients. In addition to this, the proportion of outdoor babies in our study who had jaundice and suffered from UTI is more than indoor babies. This could be due to the fact that babies coming from other hospital set up might have experienced poor facility during perinatal period or have had poor antennal history.

In our study, the most common culture proven organism that found in urine was *E. coli*. Similar results were shown by study conducted by Ozdogan EB et al depicting that *E. coli* is the most common organism found in urine culture<sup>17</sup>. On the other hand, some studies have also shown that *Klebsiella* is the most common organism followed by *E. coli*<sup>18</sup>.

## CONCLUSION

Frequency of UTI was high (31.5%) among asymptomatic jaundiced newborns. Children presenting with jaundice needs to be evaluated for UTI.

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