



DIARRHEA IN NEWBORNS; BIOCHEMICAL CHARACTERISTICS, FREQUENCY AND CAUSES OF THE IN NEWBORNS.

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ABSTRACT... Newborns mortality is the serious problem in all over the world and Diarrhea is a major cause of morbidity and mortality in children in mostly resource-constrained nations like Pakistan. **Objectives:** The study was aimed to determine causes and frequency of the diarrhea in 1st 6 months of life in term newborns, to study the biochemical characteristics and to further suggest the possible policy proposals. **Study Design:** Descriptive case series. **Setting:** Department of Pediatrics, Allied Hospital Faisalabad. **Duration:** Six months. **Subjects and Methods:** A total of 300 cases fulfilling the inclusion/exclusion criteria were enrolled to determine the frequency of acute diarrhea in newborns. Data was collected through specially designed Performa. Follow up of patients were also ensured. **Results:** In our study, out of 300 children born by cesarean delivery, 47.67%(n=143) were between 1-3 months and 4-6 months was recorded in 52.33%(n=157), mean±sd was calculated as 3.57±2.92 months, 57.33%(n=172) were male and 42.67%(n=128) were females, frequency of diarrhea was recorded in 20.33%(n=61) while 79.67%(n=239) had no findings of the morbidity. **Conclusion:** Biochemical investigation showed what kind of diarrhea an infant has. The frequency of acute diarrhea in newborns is high among those who delivered by cesarean delivery. However, it is also required that every setup should have their surveillance in order to know the frequency, reasons and causes of the problem.

Key words:

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INTRODUCTION

Diarrhea is the most important public health problem in newborns in Pakistan. Diarrhea causes 16% of all child deaths in Pakistan.¹ In Pakistan, the annual child deaths are estimated to be 456,000. In our country, one in every 20th child died due to some reason and has the fourth highest burden of child mortality in the world.² The high rate of diarrheal illnesses on the lives of Pakistani children has a strong impact on the survival of child. This impact is through both the acute and direct effect and chronic indirect impact on nutritional status.³ If timely and appropriate care is provided, death from diarrhea is preventable.

According to a study done by Doctor⁴ and Machado et al.,⁵ there was an inverse relationship between infant mortality and socio-economic factors. There was also evidence that mother's

characteristics and a child's environment were directly related to infant mortality.⁶ Parent's education and occupation was the third pair of factors that have significant influence on neonatal and child mortality in emerging countries⁷ Mosley et al.⁸ also showed that the child mortality was directly influenced by maternal and child health care services, source of drinking water, type of toilet facility and mother's education.

Caesarian section is also known to be associated with deleterious consequences in infants, one of which is acute diarrhea. Diarrhea is leading cause of death in developing countries. This is because changes in fecal flora of infants born by caesarian section under cover of prophylactic antibodies lasts for at least 6 months or longer. Fecal micro-flora plays an important role in metabolic, nutritional and immunological process in human beings.⁹

Caesarian section leads to decreased colonization of gut by bacteroids (anaerobes) and bifidobacteria.¹⁰ This may be because of interbacterial inhibition by more aero tolerant bacteria which take over intestine under sterile conditions of caesarian section.¹¹

Moreover there is increased count of clostridium Difficile, E-coli and clostridium perfringens in such infants because of prolong hospital stay. Clostridium difficile increased allergy sensitization against food or inhalant allergin¹², and Clostridium perfringens causes flatulence, diarrhea, foul smelling stools, bloody stool and abdominal distension.¹³

MATERIAL AND METHODS

Settings

- Department of Paediatrics, Allied Hospital Faisalabad
- Department of Biochemistry, Independent Medical College, Faisalabad.

Study Design

- Descriptive case series

Sampling Technique

- Non-probability consecutive sampling

Sample Size

- By using WHO sample size calculator for single proportions

Confidence Level = 95%

P = 5%¹⁰

α = 2.5%

n = 300 Patients

SAMPLE SELECTION

Inclusion Criteria

- Term newborns (0-1 Month) of both genders born by caesarian section

Exclusion Criteria

- Preterm newborns.
- Body weight < 2 Kg.
- Syndromic baby like Down syndrome, Turner syndrome because these children have more chances of having gut atresias and GIT

disturbances.

- Chronic Diarrhea due to other causes like malabsorption.
- Because all the above mentioned acted as confounders and if included produce bias in study.

DATA COLLECTION PROCEDURE

After taking approval from hospital ethical review committee PMC Faisalabad and taking informed consent from parents and guardians 300 newborns born by C-section from healthy baby clinic at Allied Hospital Faisalabad by strictly following the exclusion criteria. Complete general physical examination was done and parents or counselled regarding breast feeding for six months proper hygiene and family planning. Infants were followed up till 6 months of age for any episode of diarrhea. The stool of patients was biochemically analyzed, measuring the pH, sugars, presence of blood and the type of microbes.

Data was collected by trainee researcher through specially designed Performa which is attached hereby. Follow up of patients were ensured by taking their contact numbers and their address.

DATA ANALYSIS

All the data was entered and analyzed by using SPSS V-10. Descriptive statistics were calculated for all variables. Mean and standard deviation was calculated for all quantitative variables like age and gestational age. Frequency and percentage were calculated for all qualitative variables like gender and frequency of diarrhea.

RESULTS

A total of 300 cases fulfilling the inclusion/exclusion criteria were enrolled to determine the frequency of acute diarrhea in newborns born by caesarian section 1st 6 months of life in term newborns.

AGE DISTRIBUTION

Age distribution of the patients was done which shows that 47.67% (n=143) were between 1-3 months and 4-6 months was recorded in 52.33% (n=157), mean \pm sd was calculated as 3.57 \pm 2.92 months. (Table-I)

GENDER DISTRIBUTION

Gender distribution of newborns was recorded, 57.33% (n=172) were male and 42.67% (n=128) were females. (Table-II)

GESTATIONAL AGE

Gestational age was recorded in Table-III, where 62.33% (n=187) were between 37-38 weeks of gestation and 37.67% (n=113) were between 39-40 weeks of gestation, mean \pm sd was calculated as 38.04 \pm 0.92 weeks. (Table-III)

FREQUENCY OF DIARRHEA

Frequency of diarrhea was recorded in 20.33% (n=61) while 79.67% (n=239) had no findings of the morbidity. (Table-IV)

Age(in months)	No. of Patients	%
1-3	143	47.67
4-6	157	52.33
Total	300	100

Table-I. Age distribution of newborns (n=300)
Mean \pm sd: 3.57 \pm 2.92

Gender	No. of Patients	%
Male	172	57.33
Female	128	42.67
Total	300	100

Table-II. Gender distribution of newborns (n=300)

Gestational Age (in Weeks)	No. of Patients	%
37-38	187	62.33
39-40	113	37.67
Total	300	100

Table-III. Gestational age (n=300)
Mean \pm sd: 38.04 \pm 0.92

Frequency of Diarrhea	No. of Patients	%
Yes	61	20.33
No	239	79.67
Total	300	100

Table-IV. Frequency of diarrhea (n=300)

Biochemical Parameters	Percentage of Patients	Number of Patients
Blood	30	90
Microbes	65	195
Carbohydrates	15	45
pH (<6)	20	60

Table-V. Biochemical analysis of stool (n=300)

DISCUSSION

Based on current research we found out that in Pakistan biggest reason for neonatal diarrhea is the sanitary condition of the environment of child. However, there are many other factors which had significant influence and contribute in illness like, mode of delivery, days of hospital stay, awareness and educations of parents.^{7,8}

Over the past decades, the use of Cesarean deliveries (C-sections) has increased considerably. In many countries C-sections constitute up to 30% of all deliveries.¹⁴ Delivery by C-section causes an altered bacterial colonization of the newborn's intestine,¹⁵ which play important roles in induction of tolerance and defense against pathogens. This altered colonization causes susceptibility to various diseases included diarrhea and prolonged immunological immaturity.^{16,17,18}

We planned this study as no such research has been conducted in recent years in Pakistan and the results of this study may be helpful for reducing morbidity and mortality among infants by advising such mothers more frequent follow ups of baby.

In our study, 47.67% (n=143) were between 1-3 months and 4-6 months was recorded in 52.33% (n=157), mean \pm sd was calculated as 3.57 \pm 2.92 months, 57.33% (n=172) were male and 42.67% (n=128) were females, frequency of diarrhea was recorded in 20.33% (n=61) while 79.67% (n=239) had no findings of the morbidity.

Our findings are supported by one research at Germany incidence of diarrhea in infants born by caesarian section is 9.52%,¹⁰ but the frequency of diarrhea is higher in our study.

A study¹⁹ was done in Finland on 168 infants in the neonatal intensive care unit. They reported that caesarean section and prematurity to be significant risk factors for infectious pathogens like *Clostridium perfringens* in stool of infants. The presence of *C. perfringens* was found to be responsible for the occurrence of gastrointestinal symptoms like flatulence, diarrhea, distended abdomen and blood in stool.

Another study from Sweden reported a study which supports our results. They reported that there is a significant increase of hospital admissions for gastroenteritis in children born by C. section as compared to children born by normal or vaginal delivery.²⁰

In view of the results of current study and comparison with other studies, diarrhea in infants born by cesarean section is significantly associated with cesarean delivery, however, the morbidity and mortality among infants by advising such mothers may be reduced for more frequent follow ups of the baby.^{21,22} Table-V shows the biochemical investigation of stools. These type of lab reports are helpful to find out that what kind of diarrhea an infant has. Salmonella and C. Difficile are the bacteria which can cause bloody stools and diarrhea in babies. C. Difficile grows in the gut if the bacterial balance has been upset. The toxin intern produced by this bacterium can cause injury to the mucosa and ultimately bloody stools.^{23,24} Breastmilk inhibits the growth of the bacteria and thus tend to have less severe symptoms than non-breastfed babies In patients with diarrhea, a stool pH level of 5.5 or less or presence of reducing substances indicates carbohydrate intolerance, which is usually secondary to viral illness and transient in nature.²⁵

CONCLUSION

Biochemical investigation showed what kind of diarrhea an infant has. The frequency of acute diarrhea in newborns is high among those who delivered by cesarean delivery. However, it is also required that every setup should have their surveillance in order to know the frequency, reasons and causes of the problem.

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All you can **change** is yourself,
but sometimes that **changes** everything.



“Cary W. Goldstein”

AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Nighat Aslam	Writing of manuscript, Biochemical analysis, Main author.	
2	Sana Khalid	Data collection & procedure, Co-author.	
3	Omer Aslam	Data collection & procedure, Co-author	