"STUDY OF CLINICAL PROFILE OF ACUTE VIRAL DIARRHEA IN CHILDREN IN THE AGE GROUP 1 MONTH TO 36 MONTHS WITH SPECIAL REFERENCE TO ROTA VIRAL DIARRHEA - AN OBSERVATIONAL STUDY"

By

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Dissertation submitted to the

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In partial fulfilment of the requirements for the degree of

DOCTOR OF MEDICINE

In

PAEDIATRICS

Under the guidance of

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.....Dr. Shruti V.Soragavi.

LIST OF ABBREVIATIONS

AMP - Adenosine Mono Phosphate

A^0 - Amstrong

DLRI - Double Layered Core Replication Intermediates

EDIM - Epizootic Diarrhea of Infant Mice

ELISA - Enzyme Linked Immune Sorbent Assay

EIA - Enzyme Immune Assay

NS - Normal saline

PEM - Protein Energy Malnutrition

ORS - Oral Rehydration Solution

RL - Ringer Lactate

Tid - Thrice a day

WHO - World Health Organization

ABSTRACT

BACKGROUND :

Rotavirus is an important cause for severe dehydrating diarrhea in early childhood accounting for 20 -70% hospitalizations worldwide. The clinical manifestations alone are not sufficiently distinctive to permit diagnosis. There is a need to diagnose rotaviral diarrhea by a rapid, easy and cost effective method such as Rapid ELISA, which may lead to significant reduction in the unnecessary usage of antibiotics.

OBJECTIVES :

1. To study the clinical profile of acute viral diarrhea in children in the age group 1 to 36 months with special reference to rotaviral diarrhea
2. To calculate the incidence of rotaviral diarrhea among the admitted cases of acute viral diarrhea.

MATERIALS AND METHODS :

A hospital based observational study was carried out on 168 children with clinically suspected acute viral diarrhea and their stool samples were then subjected to Routine and Microscopy, Bacteriological culture and Rapid ELISA for detection of rotavirus antigen.

RESULTS :

The incidence of rotaviral diarrhea, among the admitted cases of acute viral diarrhea was 31% with no male or female preponderance. Second half of infancy showed highest incidence of rotavirus gastroenteritis(50%) and 48% were on

supplementary feeding. Severe dehydration was noted among 54% of rotaviral diarrhea. Mixed infections were noted in 32% .No association was seen with malnutrition and occurrence of rotavirus infection.

CONCLUSION :

There is a significant disease burden of rotavirus diarrhea among the hospitalized children less than 3 years (1-36 months) and emphasizes the need for early intervention and effective strategies for its prevention and control at the national level.

Key words: rotavirus, diarrhea, ELISA, dehydration.

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INTRODUCTION

Diarrhea is a common cause of morbidity and mortality in children. Diarrheal diseases account for a large proportion of childhood deaths with estimated 1.5 million deaths globally[1] making diarrhea the second leading cause of childhood deaths, despite the availability of easily implementable interventions and existence of National Guidelines for management at the community level.

A child below five years of age suffers from average of 2-3 episodes of diarrhea per year[2].A child is at maximum risk of diarrhea between 6 to 12 months of age.There are no major rural/ urban or gender differences in prevalence of diarrhea.

The causes of acute diarrhea in children could be various: viral, bacterial, parasitic etc.. rota virus diarrohea being the most common cause of viral diarrhea in infants and children[3]. The other causes of viral diarrhea include human Astro viruses, Calciviruses and Enteric adeno viruses 40 and 41. Other viruses such as Toroviruses, Corona viruses, Picopirnaviruses, and Human Boca virus are increasingly being identified as causative agents of diarrhea[4].

Viral gastroenteritis occurs with two epidemiologic patterns, diarrhea that is endemic in children and outbreaks that affect people of all ages; the illness affects all children worldwide in the first few years of life regardless of their level of hygiene, quality of water, food or sanitation, or type of behaviour.

Although there has been significant decline in mortality, there is lack of significant changes in the incidence. The decrease in the percentage prevalence of the other pathogens, while rota virus continues to persist, is attributed to the differing

modes of transmission among the pathogens, while leaving rota virus incidence virtually untouched.

Rota virus is the most important cause of severe life threatening gastro enteritis in children accounting for 20% to 70% of hospitalisations of children world wide. In India the incidence of rota virus varies from 5 % to 70%. Rota virus is the leading cause of diarrhea between 6 months and 24 months of age.[5]

Clinically rota virus gastro enteritis is charecterised by profuse watery diarrhea, fever, vomiting leading to mild to severe dehydration.The clinical manifestations of rota virus diarrhea alone are not sufficiently distinctive to permit diagnosis. Therefore there is a need to diagnose rota viral diarrhea by a rapid, easy and cost effective method such as Rapid ELISA.

By knowing the burden of rota viral diarrhea and by early diagnosis, effective treatment can be established and control of a potential out break can be achieved early.

Therefore, the need for this study is to know the disease burden in our hospital and to study the clinical profile of rota viral diarrhea in children in the age group 1 month – 36 months admitted in Shri B M. Patil Medical College and Hospital.

OBJECTIVES OF THE STUDY

1. To study the clinical profile of acute viral diarrhea in children in the age group 1-36 months with special reference to Rotaviral diarrhea.

2. To study the incidence of rotaviral diarrhea among the admitted cases of acute viral diarrhea.

REVIEW OF LITERATURE

HISTORY AND OVERVIEW

Before the association of rotaviruses with human disease, etiologic agents were not identified in most cases of childhood gastroenteritis. In 1963 Adams and colleagues observed virus like particles in intestinal tissue from mice infected with epizootic diarrhea of infant mice virus (EDIM)[6]. In 1973 electron microscopic examination of duodenal biopsy specimens with acute gastroenteritis revealed similar viral particles which were approximately 70 nm in diameter,[7] morphologically these particles were indistinguishable from viruses previously identified in specimens from mice with diarrhea and were designated as "ROTAVIRUSES" because of their appearance in electron micrograph as wheels with spokes[8].

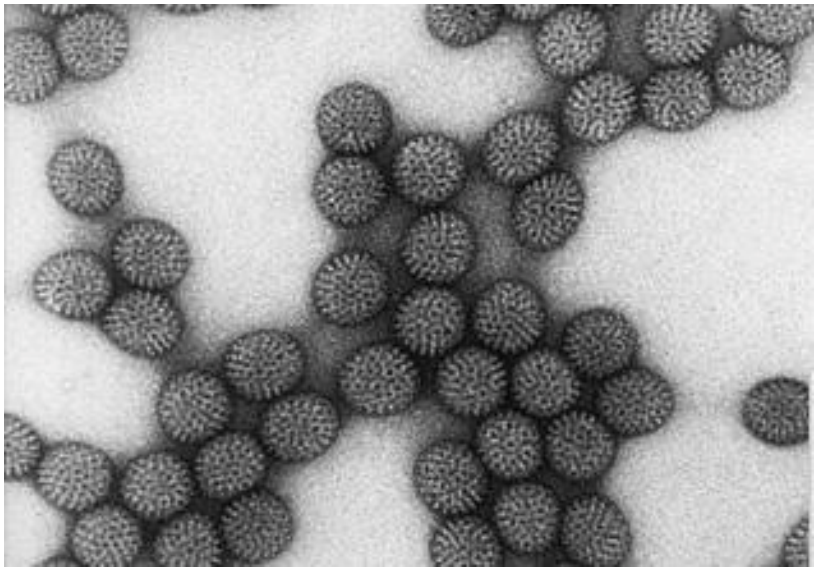


Fig 1; Electron microscopic appearance of Rota Virus.(Text: Prescott, Harley and Klein. Microbiology. 7th edition. McGraw-Hill Publishers. 2008)

After this rotavirus was also identified in faeces by electron microscopy by several studies[9,10,11]. After its discovery it became obvious that rotavirus was an important etiologic agent of diarrhea in infants and young children. On an average, 34 % of all diarrhea hospitalisations are the result of rota virus infection[12]

According to Dorsey M. Bass,[13] " in early childhood, the single most important cause of severe dehydrating diarrhea is rota virus infection. Rota virus is not only a major cause of paediatric mortality but also leads to significant morbidity."

In a study conducted by National Institute of Virology, Pune[14] "Rota virus diagnosis by rapid ELISA is simple and easy to perform. This may lead to significant reduction in the unnecessary usage of antibiotics, which cannot control infection due to rota virus."

According to Jain V, Parashar UD, Glass RI, Bhan MK,[15] " Rota virus was detected in a median of 18% of Pediatric patients and 28% of neonates. 50% of all children hospitalised with rota virus by age 5 were hospitalised by the age of 6 months, 75% by the age of 9 months, almost 100% by the age of 2 years. These data underscore the need for safe and effective interventions against rotavirus."

In a study conducted by Centre for Disease Control and Prevention, Atlanta, GA, USA[16] "Annually in India there are 2 million out patient visits <5 years of age. India spends Rs 2 to 3.4 billion annually in medical costs to treat rota virus diarrhea. The need for early diagnosis, prompt treatment and new vaccines would prevent much of this large disease and economic burden."

A prospective birth cohort study in Vellore characterised the burden of rotavirus infection among children under 3 years of age and stated that the incidence of rota virus diarrhea was 0.25 per child year in children under 3 and 0.49 per child year in children under 1. 48% of children experienced at least one episode of rotaviral diarrhea by age 3.[17]

EPIDEMIOLOGY

Epidemiology

Worldwide in 2008 diarrhea attributable to rotavirus infection resulted in 453000 deaths (95% CI 420000-494000) in children younger than 5 years 37% of deaths attributable to diarrhea and 5% of all deaths in children younger than 6 years. Five countries accounted for more than half of all deaths attributable to rotavirus infection : Democratic Republic of the Congo, Ethiopia, India, Nigeria and Pakistan ; India alone accounted for 22% of deaths.[63]

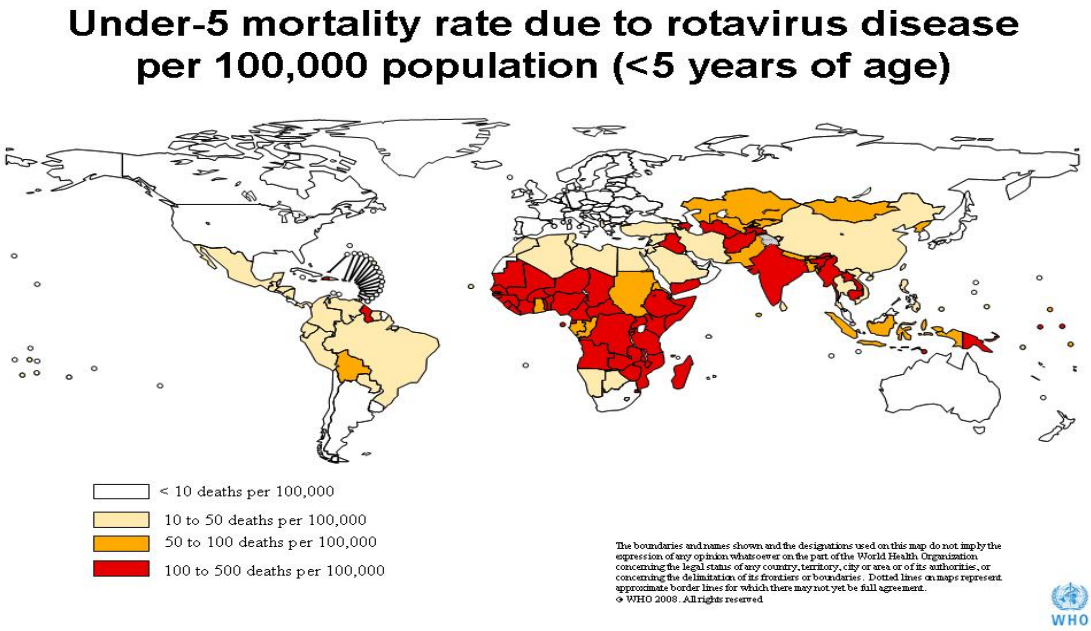


Fig 2: WHO 2008 Under 5 Mortality Due to Rota viral Diarrhea

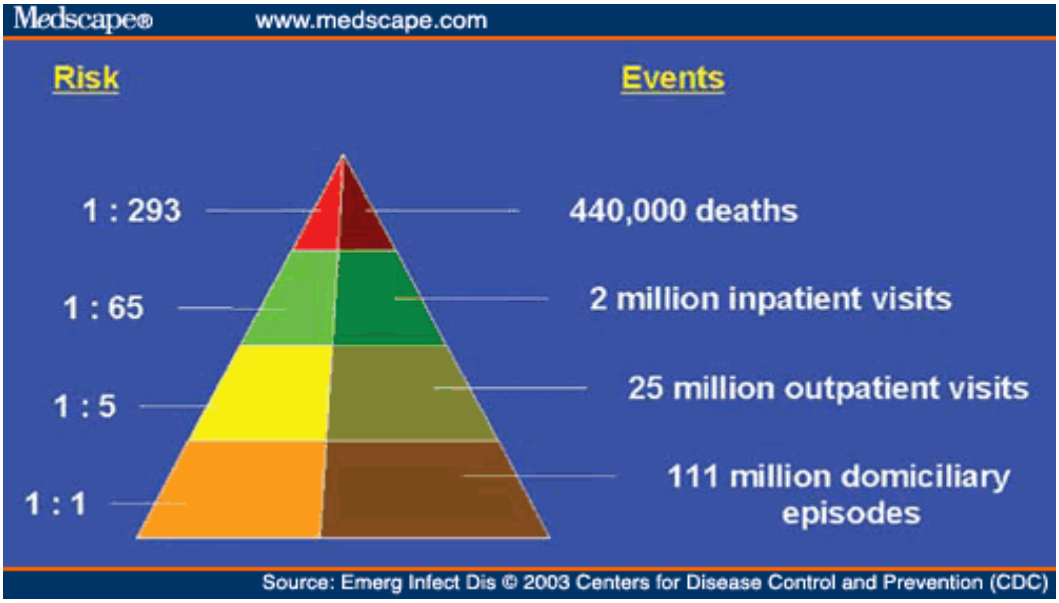


Fig 3. Global Illness and Deaths Caused by Rotavirus Disease in Children [Emerg Infect Dis 9(5), 2003. © 2003 Centers for Disease Control and Prevention (CDC)]

STRUCTURE OF ROTAVIRUS

The rotavirus virion is a non-enveloped ecosahedral particle, which is approximately 770 A^0 in diameter excluding the VP4 spike[18].

It consists of three concentric protein layers, which encapsidate eleven segments of tightly packed double stranded RNA, together with polymerase and capping enzyme complexes.

These segments encode six structural proteins(VP1,2,3,4,6 and 7) and six non-structural proteins (NSP1,2,3,4,5,6).

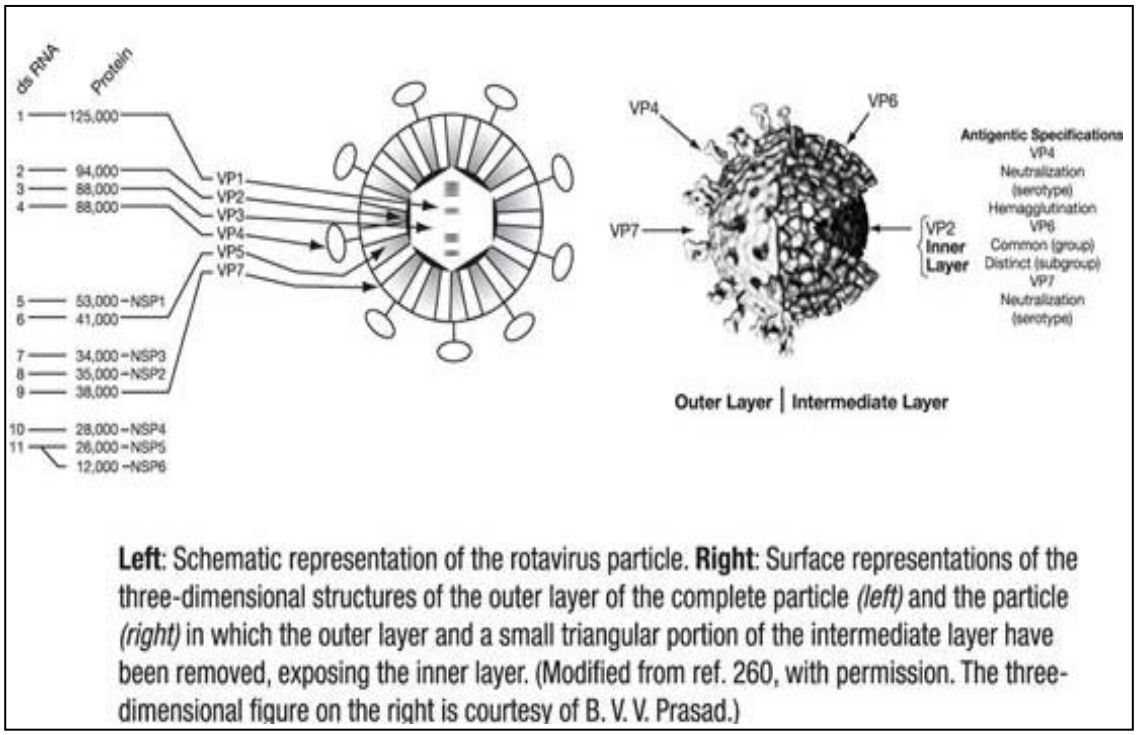
The innermost protein shell consists of one hundred and twenty copies of VP2, arranged in an ecosahedral lattice.

The middle layer consists of seven hundred and eighty copies of VP6 which form thick trimeric pillars in an ecosahedral lattice. Although not exposed on the virus surface VP6 is the target of the most abundant antibodies elicited by rotavirus infection. The genome,VP1,VP3 and the inner two protein layers make up the transcriptionally active, double layered sub viral particle. The thin outermost layer consists of seven hundred and eighty copies of a coat glycoprotein VP7 and sixty VP4 spikes which protrude from the virion[18].

Both outer layer proteins are neutralization antigen [19]. VP4 is the major cell attachment protein as well as a determinant of virulence and growth restriction[20,21].

The rotavirus particle is physically hardy and resists inactivation by treatment with fluorocarbons,ether and concentrations of chlorine typically used to treat sewage effluent and drinking water[22].

Rotavirus survival in the environment is significantly decreased at high relative humidity[22].



Left: Schematic representation of the rotavirus particle. **Right**: Surface representations of the three-dimensional structures of the outer layer of the complete particle *(left)* and the particle *(right)* in which the outer layer and a small triangular portion of the intermediate layer have been removed, exposing the inner layer. (Modified from ref. 260, with permission. The three-dimensional figure on the right is courtesy of B. V. V. Prasad.)

Fig 4 : Structure of Rota Virus(Schematic representation)

REPLICATION CYCLE OF ROTAVIRUS

Steps in the replication cycle of the virus are indicated by

1. Attachment of the virion to the cell surface.
2. Penetration and uncoating of the virus particle to yield double layered particles.
3. Primary transcription of the genomic double stranded RNA.
4. Synthesis of viral proteins.
5. Assembly of core replication intermediates and negative strand RNA synthesis.

6. Assembly of double layered core replication intermediates (DLRIs)
7. Secondary transcription from double layered replication intermediates.
8. Secondary enhanced synthesis of viral proteins.
9. Secondary increased assembly of core replication intermediates and negative strand RNA synthesis.
10. Secondary increased assembly of double layered core replication intermediates.
11. Budding of DLRIs through the membrane of endoplasmic reticulum and acquisition of transient membrane envelope.
12. Loss of the membrane envelope and generation of mature triple layered virions.
13. Virions are released by a non classic vesicular transport mechanism that bypasses the Golgi Apparatus[23].

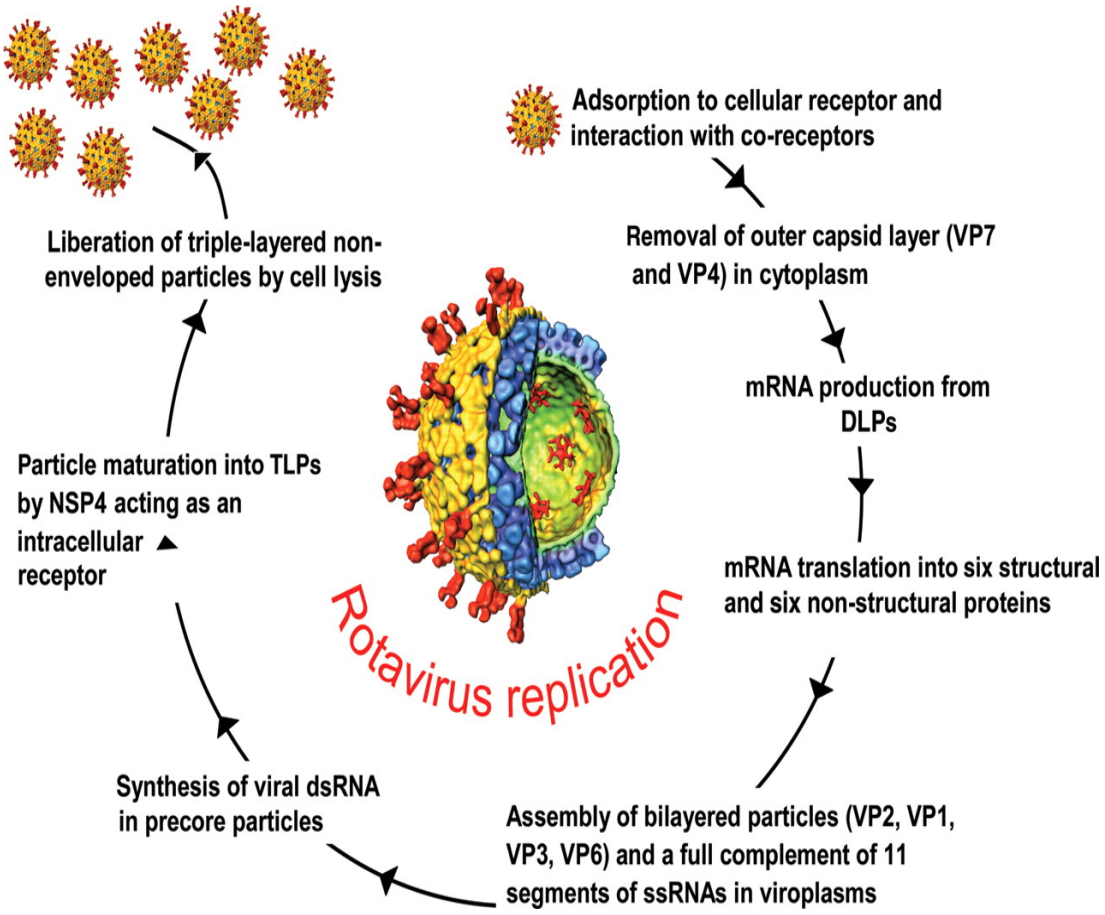


Fig 5. Replication of Rota Virus (Entry of Viruses through the Epithelial Barrier: Pathogenic Trickery Morgane Bomsel and Annette Alfsen;Nature Reviews Molecular Cell Biology 4, 57-68 ,January 2003)

PATHOGENESIS OF ROTA VIRAL DIARRHEA

The pathogenesis of rotavirus diarrhea is complex and incompletely understood, with potential roles for a viral enterotoxin, malabsorption related to mucosal damage and depression of dissachridases secretion mediated by the enteric nervous system.

The severity of diarrhea in children with rotaviral gastroenteritis correlates with degree of mucosal damage, which suggests that malabsorption related to loss of absorptive cells may contribute to rotavirus diarrhea late in infection[24].

Acute diarrhea caused by many viruses has been given significant attention in recent years. Several reviews have proposed the following hypothesis explaining age dependent rotavirus diarrhea in young children and animals[25]. The watery diarrhea may be caused by;-

1. Reduction in total small intestinal surface area leading to a decrease in net fluid absorption. This may especially have an impact at young age at the time when the absorptive capacity of the colon is not fully developed.
2. Changes in osmotic permeability of the mucosa secondary to destruction.
3. Changes in fluid and electrolyte secretion.

These phenomena contribute to diarrhea at different times during infection.

The enterocytes lining the small intestine are generally divided in to two types Enterocytes and crypt cells. Villus enterocytes are mature, nonproliferting cells covering the villi that are differentiated to digestive and absorptive functions. The absorptive enterocytes synthesize a number of disaccharidases, peptidases and other enzymes that are expressed on the apical surface, where they carry out digestive functions. Absorption across the enterocyte barrier occurs both by passive diffusion of solutes along the electro chemical or osmotic gradient and by active transport. While the majority of water transport is passive along osmotic gradients, transporters such as sodium-glucose cotransporter1 (SGLT1) transport water along with solute. The crypt epithelium lines the crypts and is the progenitor of the villus enterocytes. Crypt cells lack the well defined microvilli and absorptive functions of the enterocyte and actively secrete Cl^- ions into the intestinal lumen. In the normal animal, the combined activity of the enterocytes and crypt cells results in a constant bidirectional flux of electrolytes and water across the epithelium.[26]

Rotavirus infection alters the function of the small intestinal epithelium, resulting in diarrhea. The diarrhea was generally considered to be malabsorptive, secondary to enterocyte destruction[27.] In addition to enterocyte destruction, absorption of Na^+, water and mucosal disaccharidases are decreased while mucosal cyclic AMP appears not to be altered. Malabsorption results in the transit of undigested mono and disaccharidases, carbohydrates, fats and proteins in to the colon. The undigested bolus is osmotically active and the colon is unable to absorb sufficient water, leading to an osmotic diarrhea[28]

Another study suggested that the diarrhea was malabsorptive and resulted from epithelial damage caused by villus ischemia[29].

The secretory component of diarrhea was suggested, based on elevated levels of prostaglandin E_2(PGE_2) in the infected gut and the stimulation of secretion by PGE_2 [62.]

The viral nonstructural protein NSP4, or certain NSP4 peptides were found to have toxin like activity. The NSP4 enterotoxin activity provides a way to mediate diarrheagenic changes in the absence of significant damage or to mediate changes at uninfected sites.

Rota virus diarrhea is multifactoral, resulting from the direct effects of virus infection and the indirect effects of infection and the host response. The virus is internalized and the outer capsid is lost, activating the virion associated transcriptase. Viral proteins and RNAs concentrate in cytoplasmic structures called viroplasms, where RNA replication and packaging take place. Intracellular events, probably involving NSP4, release of Ca^{2+} from the endoplasmic reticulum. The increase in intracellular Ca^{2+} concentration triggers a number of cellular processes, including

disruption of microvillar cytoskeletal network, lowered expression of disaccharidases and other enzymes at the apical surface, general inhibition of Na^+ - solute cotransport systems and necrosis. NSP4 appears to be released specifically by a Ca^{2+} dependent, non classical secretion pathway prior to cell lysis. These events lead to a malabsorption component of the diarrhea through reduction in absorptive capacity of the epithelium, reduced activity of Na^+ -solute cotransporters and reduction of digestive enzyme expression on the epithelial surface.[62]

The release of NSP4 from infected cells allows paracrine effects to occur on uninfected cells. NSP4 binds to these cells, using specific, unidentified receptors and triggers a phospholipase C- inositol 1,3,5-triphosphate cascade that culminates in the release of Ca^{2+} from the endoplasmic reticulum, increasing the intra cellular calcium. If NSP4 acts on enterocytes, one of the results is the disruption of tight junctions, resulting in paracellular permeability. If NSP4 acts on crypt cells, the resulting increase in intracellular calcium leads to secretion in the crypt, mediated by activation of a Cl^- transporter, resulting in an increased secretory component of the diarrhea.[62]

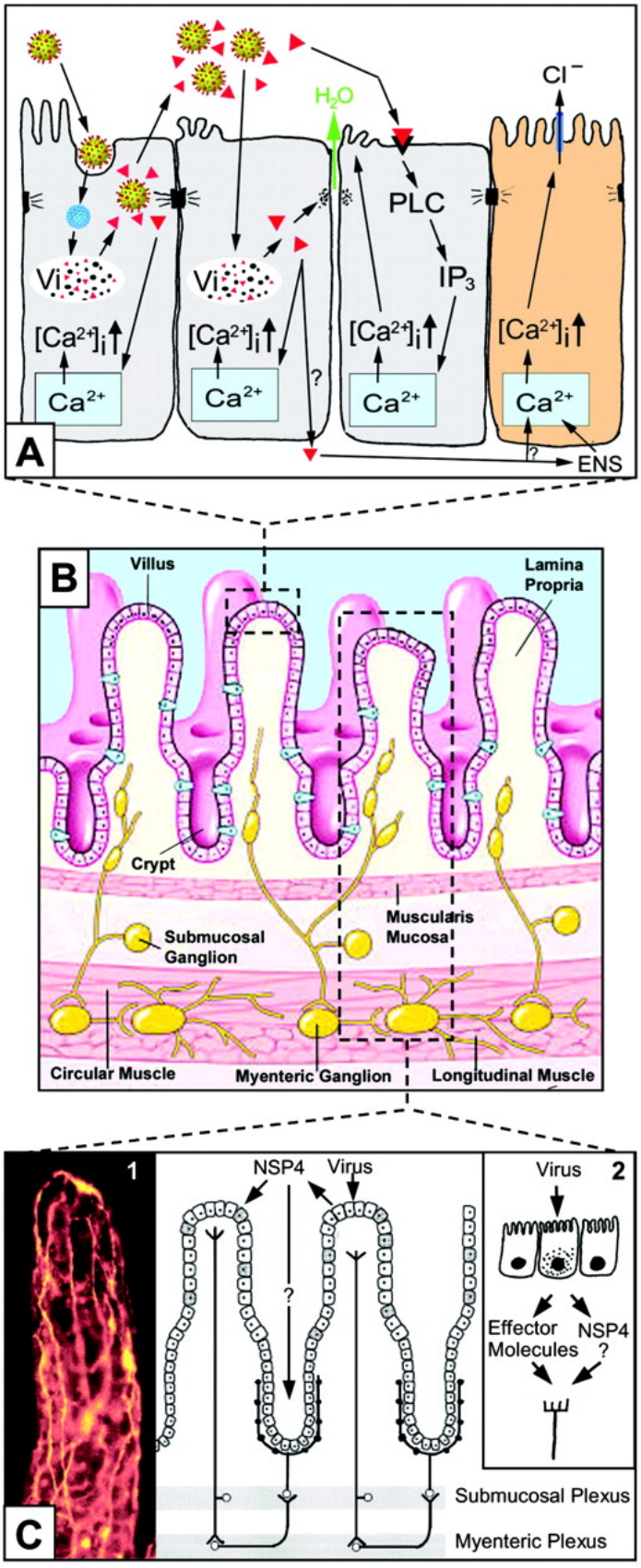


Fig 6: Raming R F: Pathogenesis of intestinal and systemic rotavirus infection, J Virol 78: 10213-10220, 2004.

CLASSIFICATION

The diversity of rotaviruses, their ability to exchange genome segments encoding antigenic determinants and changing diagnostic technology have led to evolving serology and classification systems.

The broadest serologic designation is the serogroup. The seven sero groups A to G is according to antigenic groups detectable by a number of serologic tests, such as immunofluorescence, ELISA and immunoelectron microscopy.

Group A, B, C rotaviruses are found in both humans and animals, where as Groups D, E, F, G have been found only in animals. Group A has been established as the predominant group causing human rotavirus diarrheal disease. Group B seems to be limited to causing epidemic infection in Asia and the Indian sub continent. Group C rotavirus causes endemic infections which frequently go unrecognised.[30]

Group A rotaviruses are now classified into serotypes with a binomial nomenclature, in which neutralisation by antibodies VP7 defines " G " serotype(for glycoprotein antigen) and neutralisation by antibodies against VP4 defines " P "serotype (for protease sensitive antigen).[31]

To date,15 G serotypes and 14 P serotypes have been identified.[32] A limited number of serotypic combinations cause the majority of symptomatic infections of humans. Rotaviruses with 4 such combinations(G1P8 , G2P4 , G3P8 , G4P8)caused 88.5% of Paediatric rota virus gastroenteritis cases worldwide over three decades from 1973 to 2003.[33,34]

An important feature of rota virus is their ability to reassort/rearrange their genes independently.[35] Reassortment between human and animal rotavirus strains,

antigenic drift, and the occasional introduction of animal rotavirus strains in to the pool of viruses circulating among humans provide a continuous introduction of genetic diversity, necessitating ongoing surveillance to determine whether rotavirus vaccines will require strain changes in the future for continued efficacy.[36]

CLINICAL FEATURES

Infants and young children with diarrhea caused by rota virus are more likely to have severe symptoms and become dehydrated than patients with diarrhea related to other common enteric pathogens.[37] Infection with rotavirus typically occurs in infants between ages 6 months and 2 years, although severe infection in infants younger than 6 months and in NICUs are frequently observed.[38,39]

Rota virus gastroenteritis in children generally begin with vomiting and fever, which lasts for 2 to 3 days, and progresses to profuse watery diarrhea, which continues for 4 to 5 days and presents with perianal excoriation. Vomiting is more prolonged with rotavirus gastro enteritis than with other viral diarrheas [37]

Severe dehydration and electrolyte abnormalities leading to cardiovascular failure are the most proximate causes of death from rotaviral gastro enteritis. Extra intestinal manifestations like hepatic and renal complications are seen with severe PEM and immune compromised children.

DIAGNOSIS

Rotavirus gastroenreritis is not clearly distinguished from other causes of acute gastroenteritis on clinical grounds alone. Definitive diagnosis of rotavirus gastroenteritis helps in preventing unnecessary and potentially harmful use of antibiotics.

Rotavirus can be detected by numerous techniques, including a variety of commercial antigenic assays, RT-PCR, electron microscopy, immune electron microscopy, polyacrylamide gel electrophoresis (PAGE) for viral genomic RNA and viral culture. Detection of viral antigen in stool or rectal swabs, most commonly using ELISA or latex agglutination formats forms the basis for practical, commercially available and widely used diagnostic kits.[39] The commercial antigenic assays primarily detect the VP2 and VP6 proteins of the subviral double layered particle and detect only group A rotaviruses.[40] Rota virus antigen detection by standard ELISA has excellent sensitivity of 93 to 100% and specificity of 98 to 100%. Latex agglutination and electron microscopy have also been used but they are technically demanding and less sensitive when compared to rapid ELISA.

The kit used for this study was " PREMIERE ROTACLONE "™ an EIA for the detection of rotavirus antigen in human faecal samples.

TREATMENT

As rotavirus gastroenteritis is generally self limited and dehydration is the primary cause of morbidity and mortality, dehydration is the primary cause of morbidity and mortality, rehydration and restoration of electrolytes are the primary therapies. Low osmolarity WHO ORS (245 mosm/L) is recommended as it causes less vomiting, lower stool output and a reduced need for IV infusions [41]. Despite the depressed levels of disaccharidase, it is recommended to continue breastfeeding during rehydration. In severe dehydration RL or NS is recommended.[42]

Randomised Control Trials in developing countries have demonstrated that short courses of zinc supplementation for 10 to 14 days significantly decreased the prevalence of diarrheal disease. On this basis, WHO has recommended Zinc

supplementation 10mg/day for infants under 6 months and 20mg/day for older infants for a period of 10 to 14 days [43]

Racecadotril is an enkephalinise inhibitor that inhibits intestinal hypersecretion and has been used as an adjunct to ORS. Dose of 1.5mg/kg tid is recommended.[44]

Nitazoxanide 7.5mg/kg bd for 5 days. Nitazoxanide is found to have broad spectrum antiviral effect, inhibiting the structural protein of virus being synthesised [45]

Oral administration of inj IgG is not indicated routinely but has shown to be efficacious in chronic rota viral diarrhea by reducing the viral shedding.[46]

Oral administration of probiotics such as lactobacillus and saccharomyces boulardii appears to shorten the duration of diarrhea by about 0.7days[47]

PREVENTION

Because lack of access to treatment is one of the major causes of childhood mortality from rota virus, and improved sanitation has limited impact on rotavirus prevalence, prevention by immunisation is a critical approach to decreasing the impact of this infection. WHO has recommended inclusion of rota virus vaccine in the national schedules where under 5 mortality due to diarrheal diseases is 10%.

Rota virus vaccines [48]

Presently there are two vaccines available against rotavirus.

ROTARIX (GlaxoSmithKline) is a monovalent vaccine created but attenuating a highly antigenic strain of human G1P8 rotavirus recommended to be orally administered in two doses at 2 and 4 months.

ROTA TEQ (Merck) is a pentavalent vaccine created by reasserting G and P antigens from human rotavirus, G1, G2,G3,G4 AND P1 with a bovine rotavirus strain recommended to be orally administered in three doses at 2, 4 and 6 months.

As the efficacy data from our country is not known, both vaccines have been extensively used in a number of high and low income settings. IAPCOI (Indian Academy of Paediatrics Committee on Immunisation) stresses the need of having more data on rotavirus disease burden in India and optimise the use of rotavirus vaccines in India to achieve higher yields in term of protective efficacy. For the want of adequate data, the committee is not able to issue any specific recommendation on the suitability of a particular rotavirus vaccine for the country.[49]

MATERIALS AND METHODS

1. **Type of the study-** It is a hospital based observational study, to ascertain the clinical profile of acute viral diarrhea in children in the age group of 1-36 months, with special reference to rotaviral diarrhea.
2. **Source of data-** All clinically suspected children with acute viral diarrhea in the age group 1-36 months either admitted or treated on OPD basis in SHRI B.M PATIL MEDICAL COLLEGE AND HOSPITAL, BIJAPUR.
3. **Duration of the study-** October 2011- October 2013.
4. **Method of study-**
   I. Children with clinically suspected acute viral diarrhea between the age group of 1-36 months were evaluated by history and thorough clinical examination.
   II. Faecal samples of these children were then subjected to
      a. Stool routine and microscopy,
      b. Stool bacterial culture
      c. Rapid ELISA test for detection of Rotaviral antigen in stool specimen.
5. **Sample Size-** with the incidence of rotavirus diarrhea [50] ranging from 5-70%, considering 35% (average)as the incidence, with 95% CI and 15 % allowable error,

$$n = \frac{z^2 \times p(1-p)}{L^2}$$

$$= \frac{(1.96)^2 \times 0.35(1-0.35)}{0.0225}$$

$$= 40$$

n=sample size,
z= table value of standard normal variant
p= incidence of children having the disease
L= allowable erro

6. SELECTION CRITERIA

Inclusion criteria

1. All children with clinically suspected acute viral diarrhea in the age group 1-36 months admitted in Shri B. M.Patil Medical College and Hospital, Bijapur.
2. All children with clinically suspected acute viral diarrhea in the age group 1-36 months treated on OPD basis in Shri B. M.Patil Medical College and Hospital, Bijapur.

Exclusion Criteria

1. Children with diarrhea due to suspected immunodeficiency.
2. Children who have been immunised with Rotavirus vaccine.
3. Children with persistent or chronic diarrhea.
4. Children with clinical features suggestive of bacillary dysentery.

7. Clinical data was collected according to the proforma attached.

8. Stool samples were collected from children with clinically suspected cases of viral diarrhea in sterile containers, transported in ice lined boxes and stored at -20 degree Celsius at the Department of Virology and Microbiology for testing at a later date when adequate samples were collected.

9. The stool samples were analysed for rota virus antigen by ELISA technique using rotavirus antigen detection microwell ELISA kit by "PREMIERE ROTACLONE"^{TM}. This ELISA based test is used for qualitative determination of rota virus antigen in stool.

Principle of the procedure : This method utilises monoclonal antibodies in a solid phase sandwich type EIA. Microtiter wells are coated with monoclonal

antibody directed against VP6. Fecal suspension is added to the well and incubated with an anti rota virus monoclonal antibody conjugated to peroxidase, resulting in rota virus antigen being sandwiched between the solid phase and enzyme linked antibodies. After 60 minutes, sample well is washed in order to remove the unbound antibodies. Enzyme substrate A and substrate B are added to the wells and incubated for 10 min. The enzyme bound in the wells converts the colourless substrate to a blue colour. The presence of blue colour indicates reactivity i,e presence of rotaviral antigen.

10. Statistical analysis was done using chi square test to calculate the incidence of rota virus diarrhea and factors associated with rota viral infection in our set up.

Fig 7: transport of stool specimen in ice lined boxes

Fig:8 EIA for the detection of Rotavirus Antigen in Human Fecal Samples (Ref Catalog No.696004)

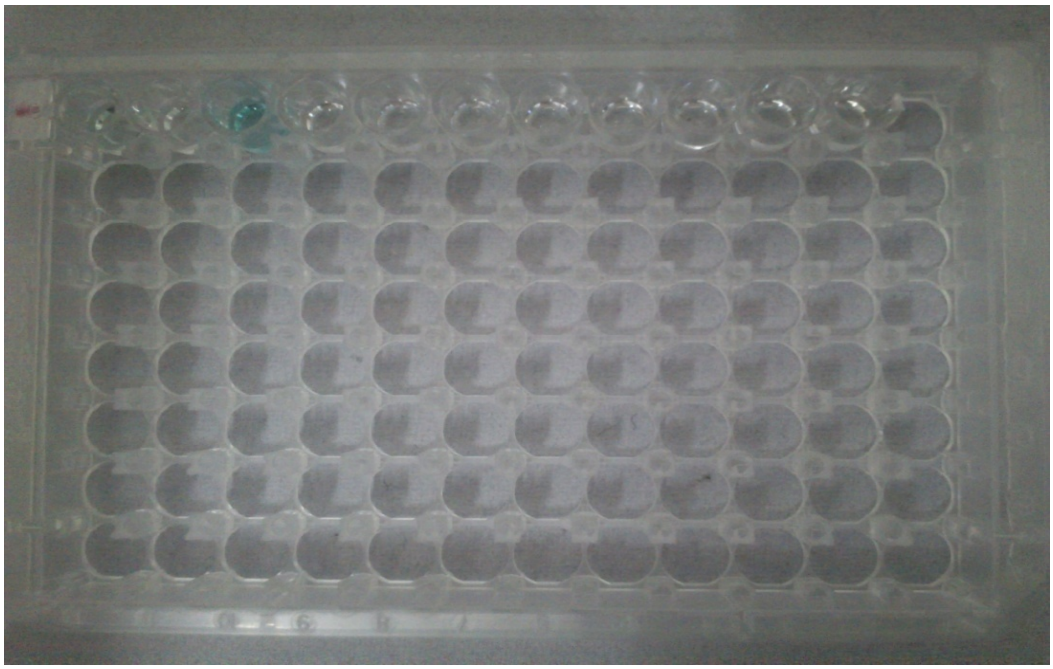


Fig:9 ROTA VIRUS ELISA: Distinct blue colour indicates reactivity

RESULTS

In the given study period, a total of 168 samples were collected and clinical data was obtained accordingly.

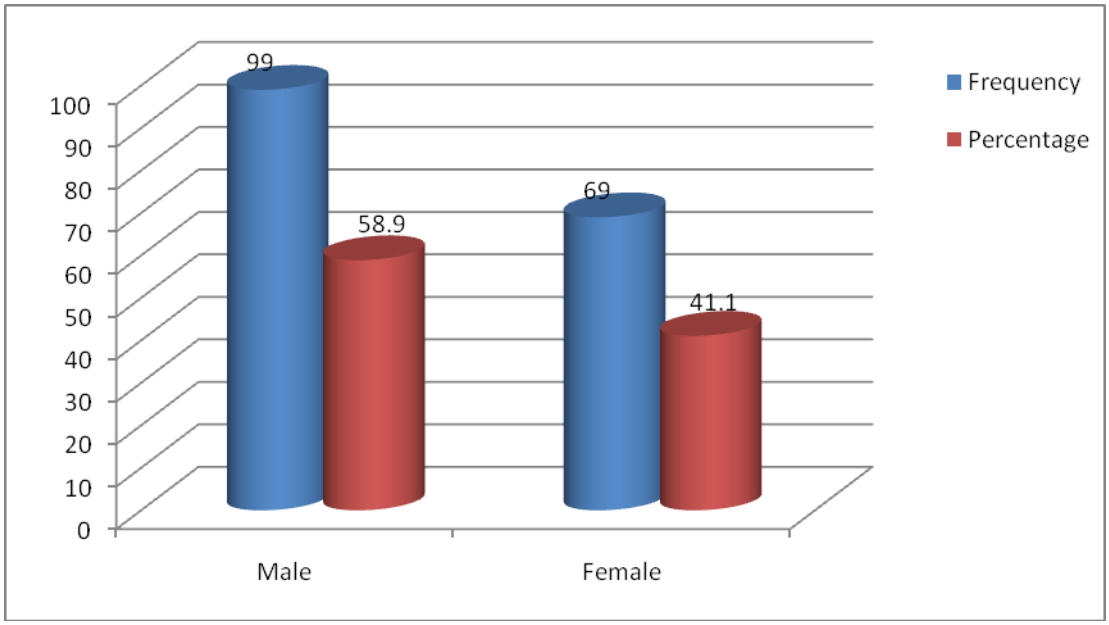
DEMOGRAPHIC DATA

1. GENDER WISE DISTRIBUTION OF PATIENTS

Table no 1: Frequency and percentage distribution of patients according to sex

Sex	Frequency	Percentage
Male	99	58.9
Female	69	41.1
Total	168	100.0

Graph no 1: Bar graph of frequency and percentage distribution of patients according to sex



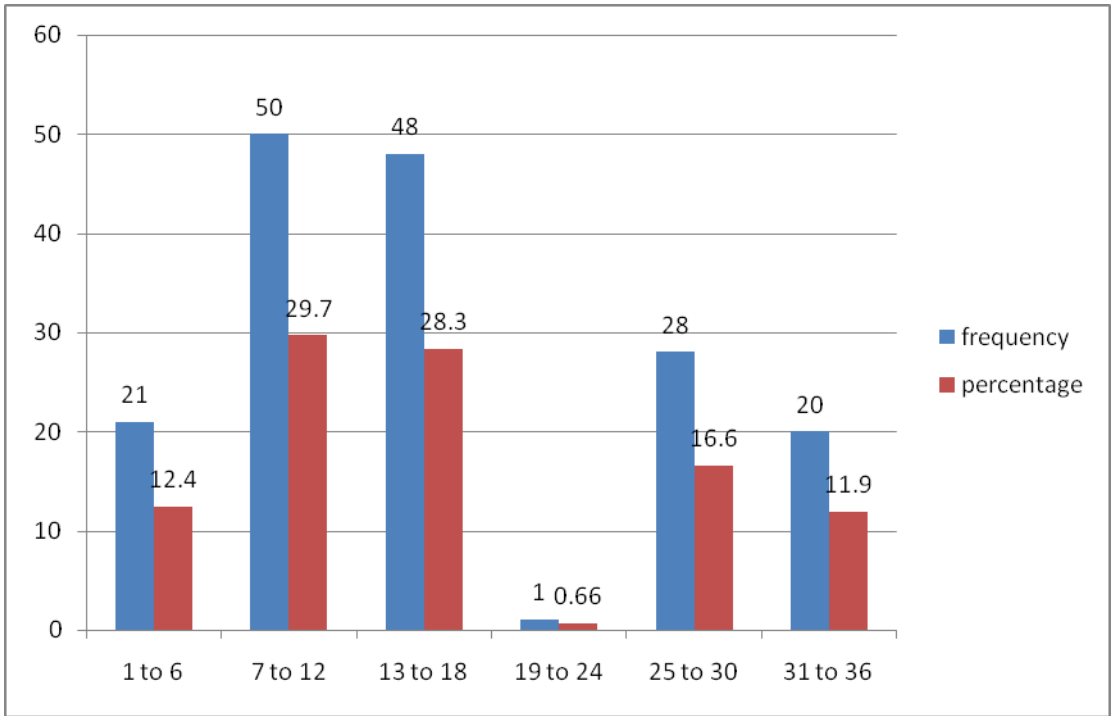
Out of 168 children, 99(58.9) were males and 69 (41.1)were females.

2. DISTRIBUTION OF PATIENTS WITH RESPECT TO AGE (IN MONTHS)

Table No 2 : Frequency and percentage distribution of patients according to age groups

Age group in months	Frequency	Percentage(%)
1-6	21	12.4
7-12	50	29.7
13-18	48	28.3
19-24	01	0.6
25-30	28	16.6
31-36	20	11.9
Total	168	100

Graph no 2: Bar graph of frequency and percentage distribution of patients according to age groups



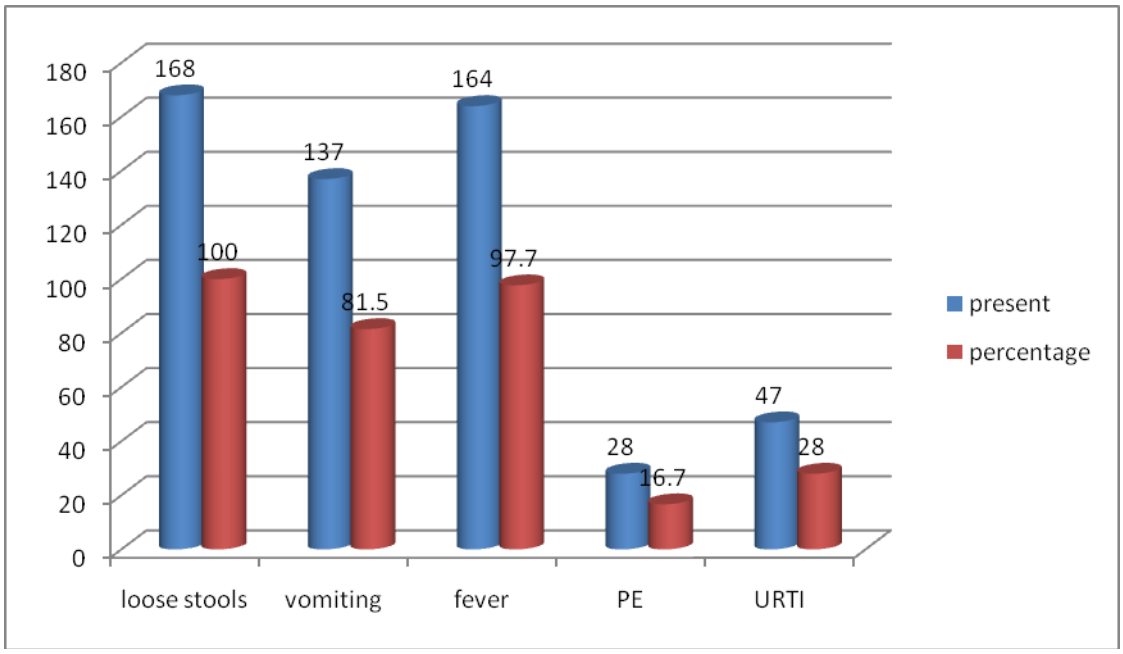
Out of 168 children, 50 (29.7%) children were in the age group of 7-12 months , followed by 48(28.3%) children in the age group of 13-18 months.

3. DISTRIBUTION OF PATIENTS ACCORDING TO CLINICAL FEATURES

Table no 3: Frequency and percentage distribution of patients according to clinical features

Clinical features	Present	Percentage	Absent	Percentage	Total
Loose Stools	168	100.0	00	00	168
Vomiting	137	81.5	31	18.5	168
Fever	164	97.7	02	2.30	168
PE	28	16.7	140	83.3	168
URTI	47	28.0	121	72.0	168

Graph no 3: Bar graph showing distribution of patients according to clinical features



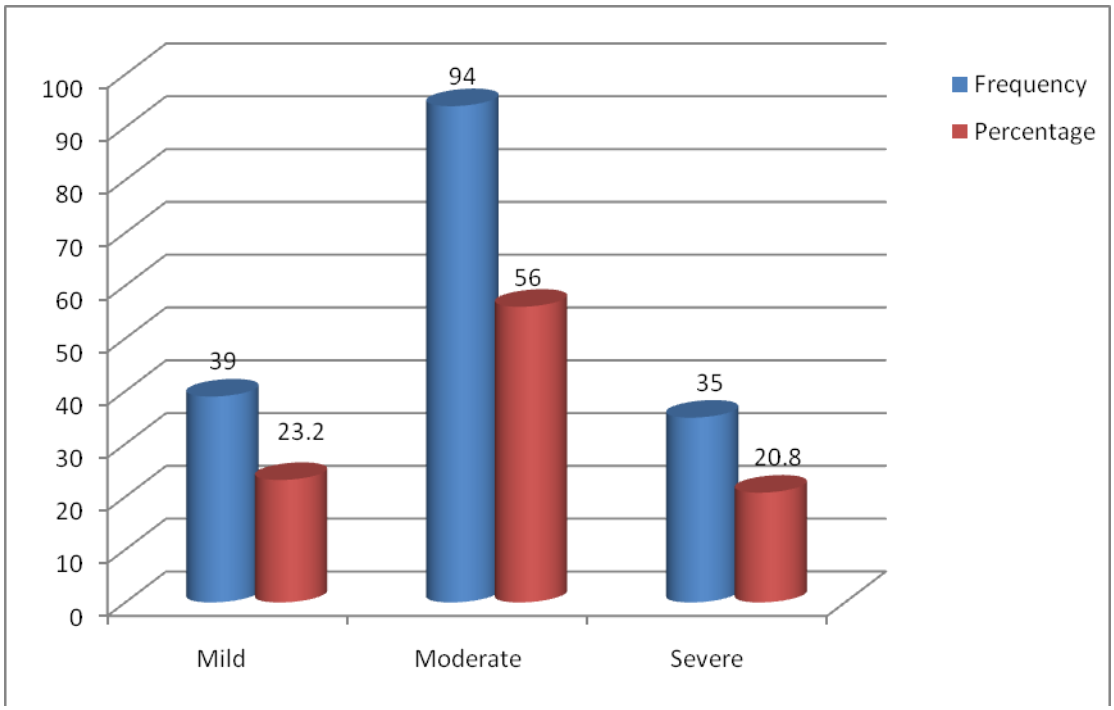
All children presented with loosestools, 164(97%) presented with fever, 137 (81.5%) presented with vomiting, 47(28%) children presented with upper respiratory infection and 28(16%) presented with perianal excoriation.

4. DISTRIBUTION OF PATIENTS ACCORDING TO DEHYDRATION STATUS

Table no 4: Frequency and percentage distribution of patients according to dehydration status

Dehydration	Frequency	Percentage
MILD	39	23.2
MODERATE	94	56.0
SEVERE	35	20.8
Total	168	100.0

Graph no 4: Frequency and percentage distribution of patients according to dehydration status



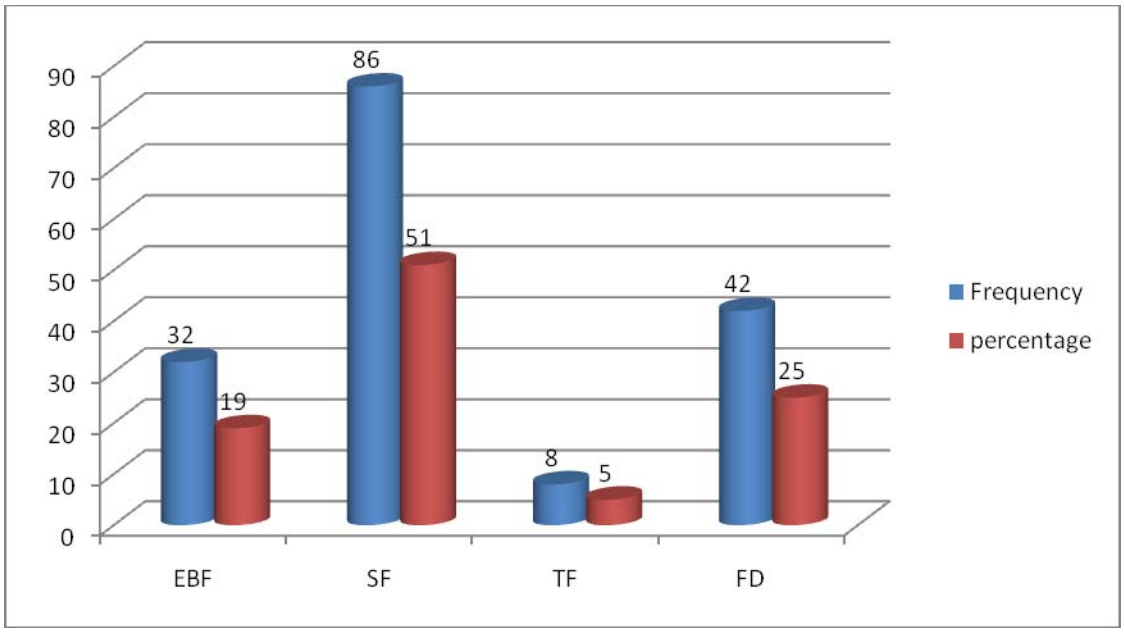
39 (23.2%) presented with mild dehydration, 94(56%) presented with moderate dehydration and 35(20%) presented with severe dehydration.

5. DISTRIBUTION OF PATIENTS WITH RESPECT TO TYPE OF FEEDING

Table no 5 : Frequency and percentage distribution of patients according to feeding history

Feeding history	Frequency	Percentage
EBF	32	19
SF	86	51
TF	08	5
FD	42	25
Total	168	100

Graph no 5: Frequency and percentage distribution of patients according to feeding history



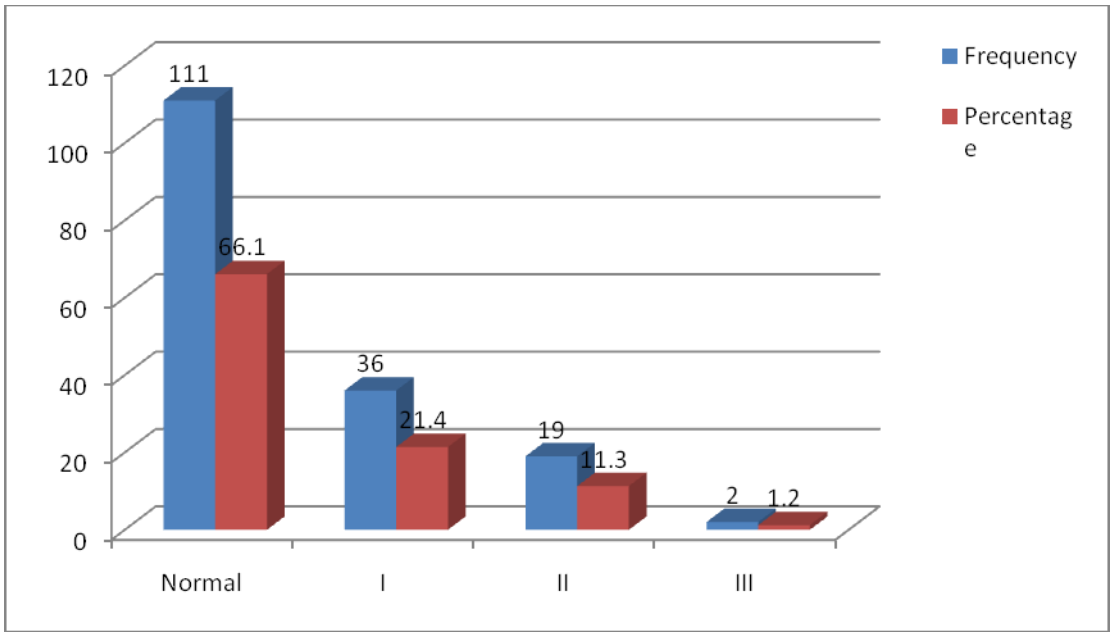
Out of 168 children, 32(19%) were exclusively breastfed, 86 were on supplementary feeding (51%), 8(5%) were top fed and 42(25%) were on family diet.

6. DISTRIBUTION OF PATIENTS WITH RESPECT TO IAP GRADE OF PEM

Table No 6: Frequency and percentage distribution of patients according to grade of PEM

Grade	Frequency	Percentage
Normal	111	66.1
I	36	21.4
II	19	11.3
III	2	1.2
Total	168	100.0

Graph no 6: Frequency and percentage distribution of patients according to grade



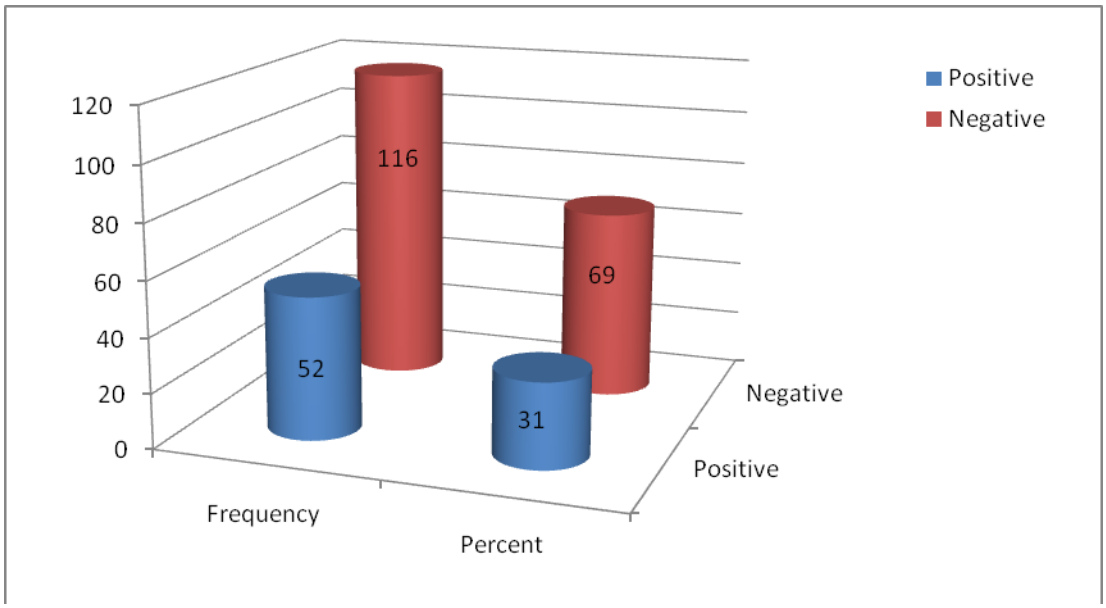
Out of 168 children, 111(66%) were normally nourished, 36(21.4%) were Grade I malnourished, 19 (11.3%) were Grade II malnourished and 2(1.2%) were Grade III malnourished.

7. DISTRIBUTION OF PATIENTS WITH RESPECT TO POSITIVITY FOR ROTA VIRUS ELISA.

Table no 7: Frequency and percentage distribution of patients according to positivity of Rota Virus ELISA

Rota virus elisa	Frequency	Percent
Positive	52	31.0
Negative	116	69.0
Total	168	100.0

Graph no 7:Frequency and percentage distribution of patients according to positivity of Rota Virus Elisa



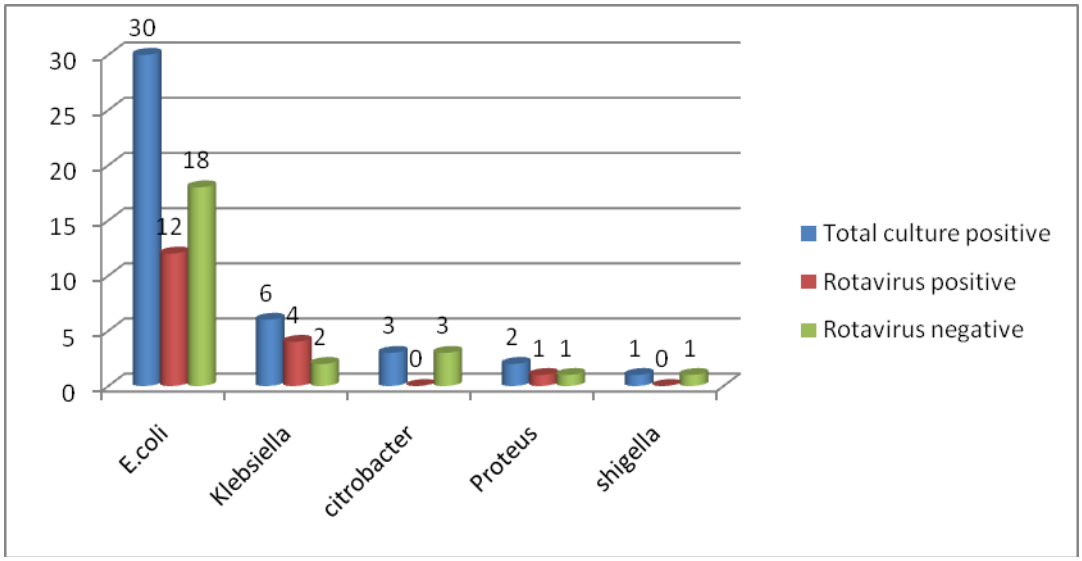
Out of 168 stool samples, 52(31%) tested positive for rotavirus ELISA and 116(69%) tested negative for rotavirus ELISA.

8. DISTRIBUTION WITH RESPECT TO STOOL BACTERIOLOGICAL CULTURE

Table 8: Distribution of patients according to stool culture

Stool bacteriological culture	Total culture positive	Rotavirus positive	Rotavirus negative
E.coli	30	12	18
Klebsiella	6	4	2
Citrobacter	3	0	3
Proteus	2	1	1
Shigella	1	0	1
Total	42	17	25

Graph 8: Distribution of patients according to stool culture



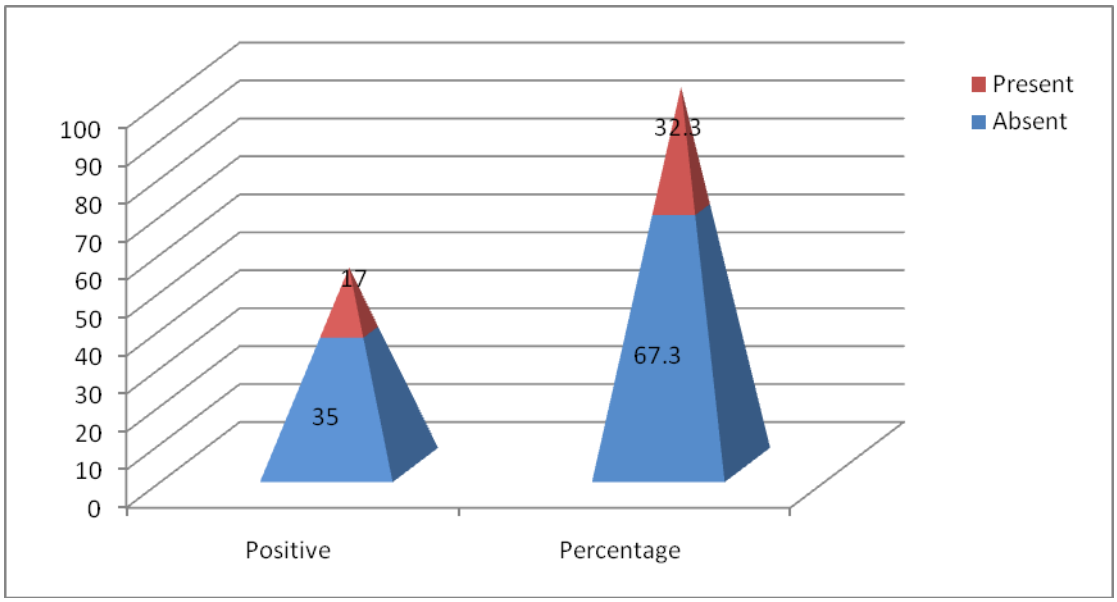
Out of 168 samples subjected for stool culture, 42 samples were positive for bacteria(30 positive for E.coli, 6 positive for Klebsiella, 3 positive for Citrobacter species, 2 for Proteus and 1 for Shigella).

9. DISTRIBUTION OF PATIENTS WITH MIXED INFECTION

Table no 9: Distribution of patients according to mixed infection.

Mixed Infection	Rotavirus positive	Percentage
Absent	35	67.3
Present	17	32.7
Total	52	100.0

Graph no 9 : Distribution of patients according to mixed infection.



Out of 42 bacteriologically positive stool culture, 17(32.3%) were positive for both rotavirus and bacteria in the stool samples, indicating mixed infection.

Organisms Isolated in Mixed Infections

ORGANISM	NUMBER
E.COLI	12
CITROBACTER	0
KLEBSIELLA	4
PROTEUS	1
SHIGELLA	0
TOTAL	17

Out of 17 cases of mixed infection, 12 were positive for E coli (70%), 4 were positive for klebsiella (23.5%) and 1 was positive for proteus (6%).

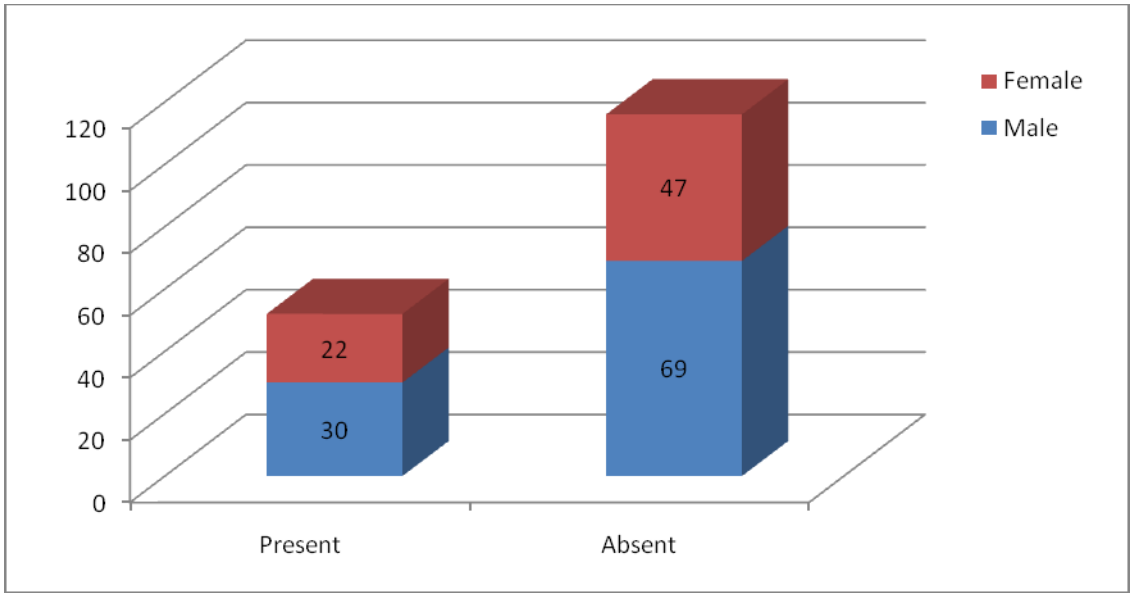
FACTORS ASSOCIATED WITH ROTA VIRUS INFECTION

10. ASSOCIATION BETWEEN GENDER AND OCCURRENCE OF ROTA VIRUS

Table no 10: Sex wise distribution of patients according to Rota Virus Elisa

Sex	Rota Virus Elisa				
	Present	Percentage	Absent	Percentage	p-value
Male	30	57.7%	69	59.5%	0.827
Female	22	42.3%	47	40.5%	
Total	52	100.0%	116	100.0%	

Graph no 10: Sex wise distribution of patients according to Rota Virus Elisa



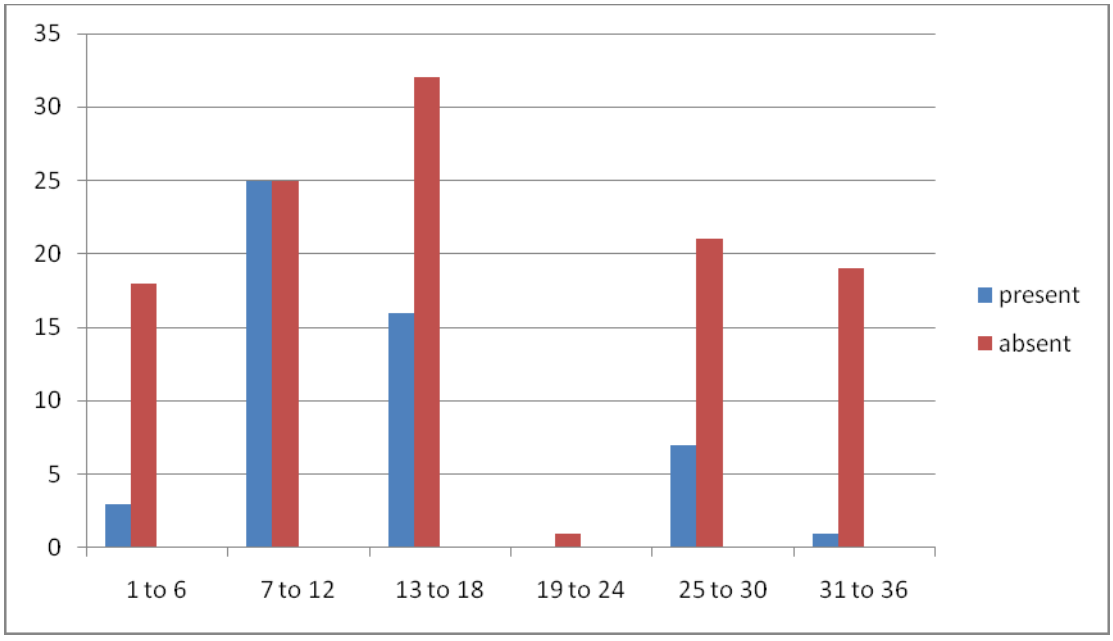
By using chi square test there is no significant association between gender and rota virus infection

11. ASSOCIATION BETWEEN AGE GROUPS AND ROTA VIRUS DIARRHEA

Table No 11: Age wise Distribution of patients according to Rota Virus Elisa

Age in months	Positive	Positive percentage (%)	Negative	Negative percentage (%)	P value
1-6	3	6	18	16	
7-12	25	48	25	21.5	
13-18	16	31	32	27.5	
19-24	0	0	1	0.9	0.0023
25-30	7	13	21	18	
31-36	1	2	19	16	
Total	52	100	116	100	

Graph No 11: Age wise Distribution of patients according to Rota Virus Elisa



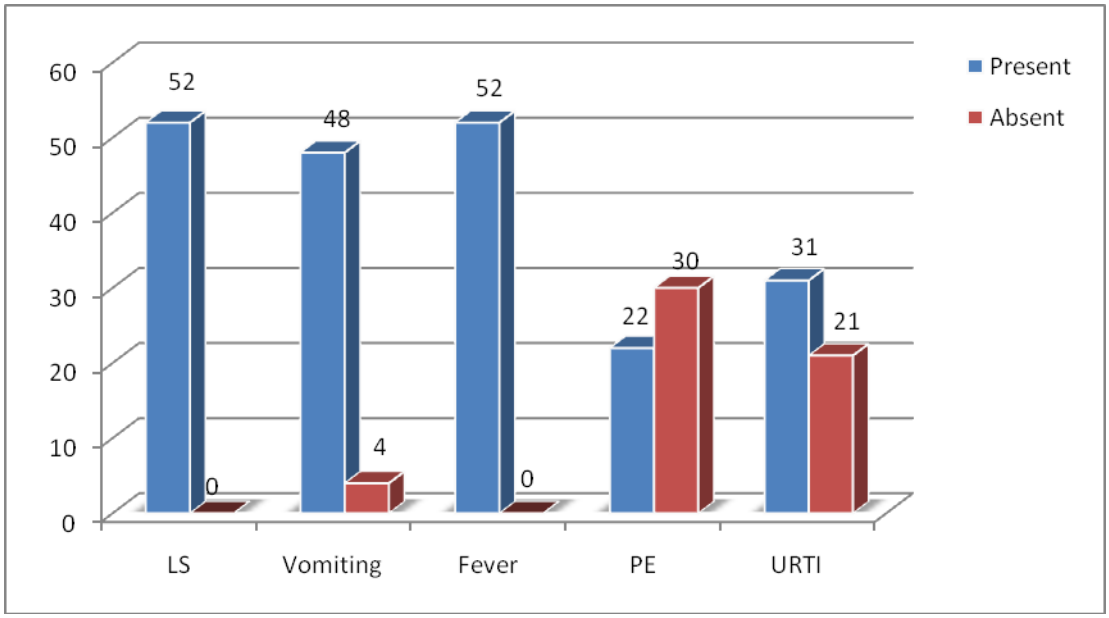
By using chi suare test, there is significant association between the age groups and rotavirus infection, with 48% positive cases in the age group 7-12 months, followed by 31% in the age group of 13-18 months.

12. ASSOCIATION BETWEEN CLINICAL FEATURES AND OCCURRENCE OF ROTA VIRUS INFECTION

Table no 12: Clinical features wise distribution of patients according to Rota Virus ELISA

Clinical features		Rota Virus Elisa				
		Present	Percentage	Absent	Percentage	p-value
Loose stools	Present	52	100	116	100	
	Absent	00	00	00	00	
Vomiting	Present	48	92.3	89	76.7	0.016*
	Absent	04	7.7	27	23.3	
Fever	Present	52	100	114	98.3	0.0001*
	Absent	00	00	02	1.70	
PE	Present	22	42.3	6	5.2	<0.0001*
	Absent	30	57.7	110	94.8	
URTI	Present	31	59.6	16	13.8	0.0009*
	Absent	21	40.4	100	86.2	

Graph no 12 : Clinical features wise distribution of patients according to Rota Virus ELISA



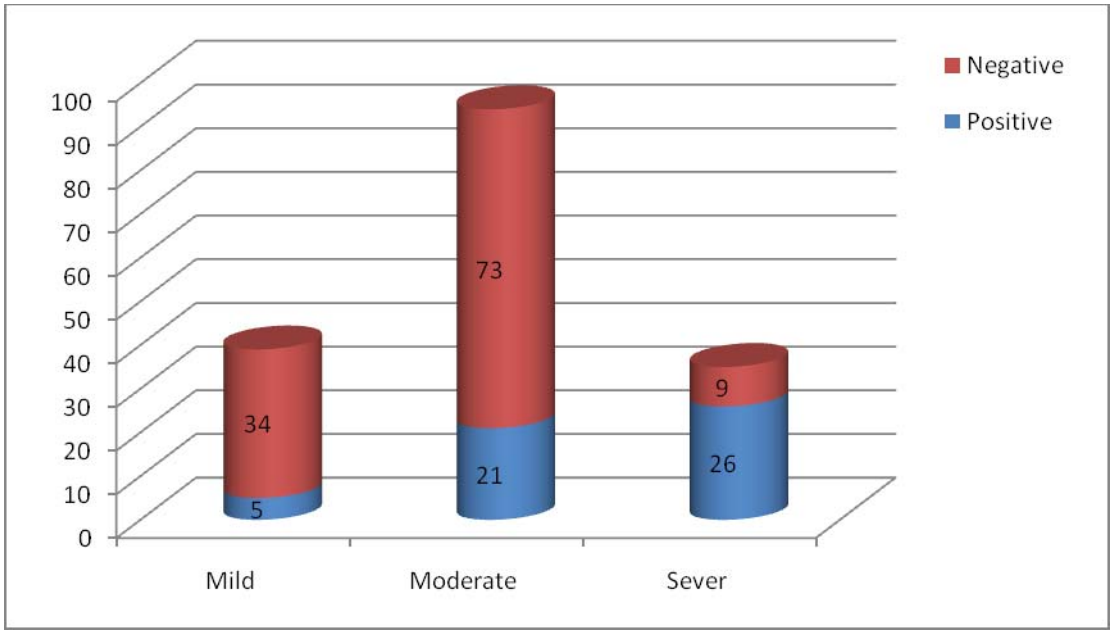
By using chi square test, all symptoms are significantly associated with rota virus infection

13. ASSOCIATION BETWEEN TYPE OF DEHYDRATION AND ROTAVIRUS INFECTION

Table no 13 : Distribution of patients according to Dehydration.

	Rota Virus Elisa				
Dehydration	**Positive**	**Percentage**	**Negative**	**Percentage**	**p-value**
Mild	5	9.6	34	29.3	< 0.0002*
Moderate	21	40.4	73	62.9	
Severe	26	50.0	9	7.8	
Total	52	100.0	116	100.0	

Graph No 13 : Distribution of patients according to Dehydration.



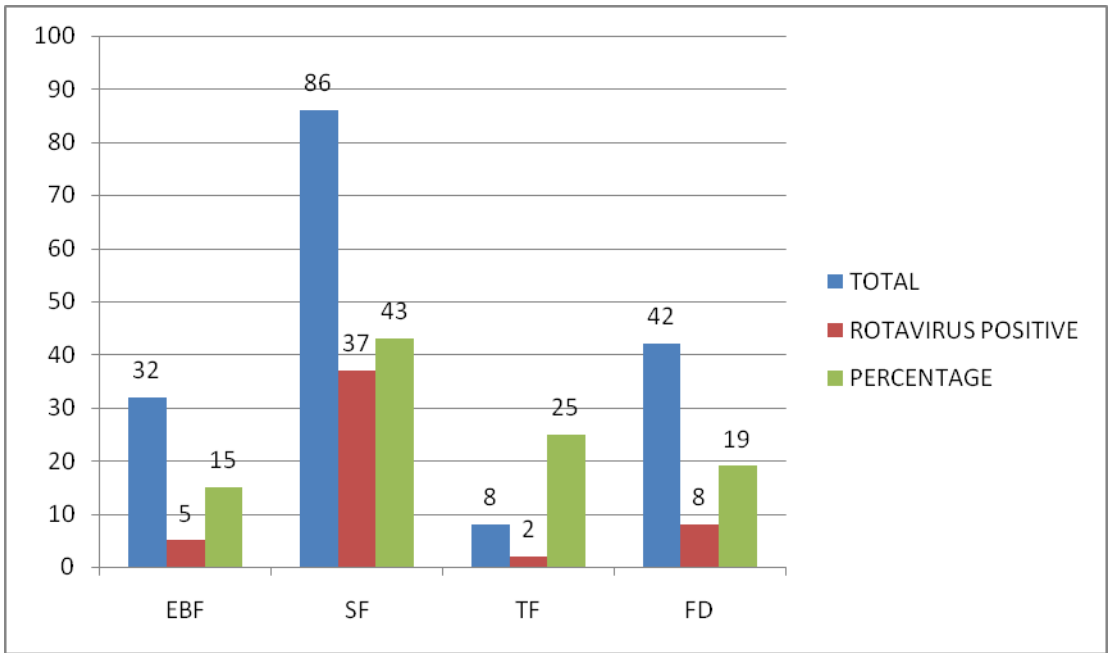
By using chi square test, there is significant association between type of dehydration and rotavirus infection, with 50% rotaviral diarrhea presenting with severe dehydration.

14. ASSOCIATION BETWEEN TYPE OF FEEDING AND OCCURRENCE OF ROTA VIRAL DIARRHEA

Table no 14 : Distribution of patients according to type of Feeding

Type of feeding	Total	Rotavirus positive	Percentage	p-value
EBF	32	5	15.0	
SF	86	37	43.0	0.0096
TF	08	02	25.0	
FD	42	08	19.0	
TOTAL CASES	168	52	100	

Graph no 14 : Association between type of Feeding and rotavirus infection



By using chi square test, there is significant association between type of feeding and rotavirus infection.

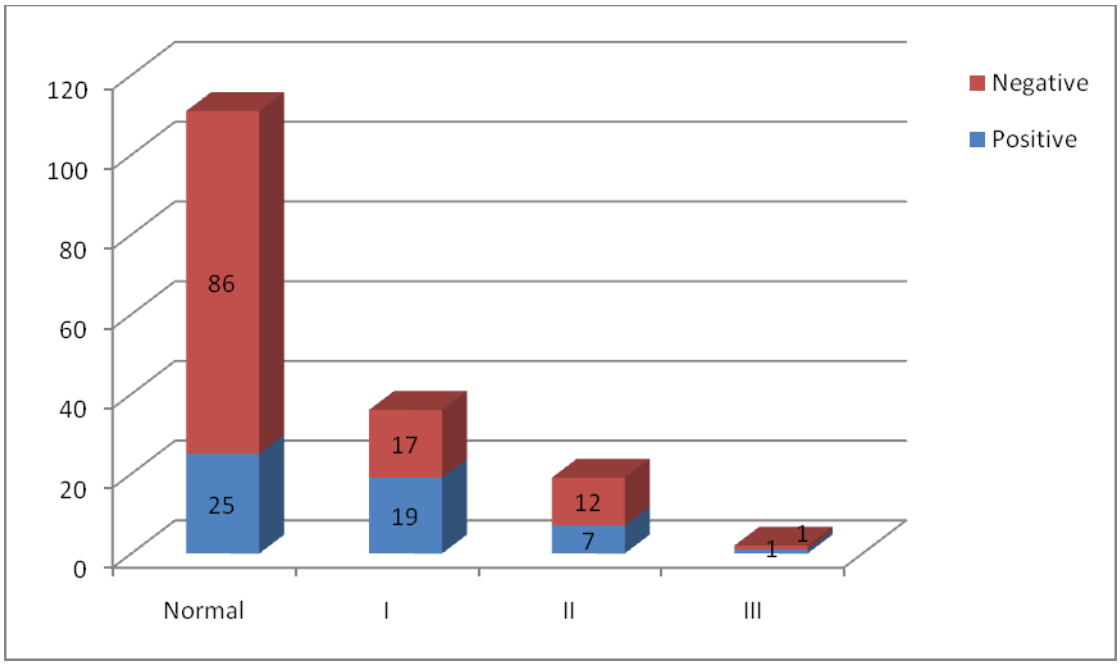
43% of children with rotaviral diarrhea were on supplementary feeding.

15. ASSOCIATION BETWEEN IAP GRADE OF PEM AND OCCURRENCE OF ROTA VIRUS INFECTION

Table no 15 : Grade wise distribution of patients according to Rota Virus ELISA

	Rota Virus Elisa				
Grade	**Positive**	**Percentage**	**Negative**	**Percentage**	**p-value**
Normal	25	48.1	86	74.1	0.06
I	19	36.5	17	14.7	
II	7	13.5	12	10.3	
III	1	1.9	1	0.9	
Total	52	100	116	100.0	

Graph no 15 : Grade wise distribution of patients according to rota virus elisa



By using chi-square test, there is no significant association between grade of PEM and rota virus infection

DISCUSSION

Acute gastro enteritis is one of the most common diseases, affecting children worldwide. Viruses are recognised as a major cause of this disease, particularly in children. Rota virus is the most common cause of severe diarrhea in children under 5 years of age.

Incidence of Rotavirus Diarrhea

In our study of 168 cases of clinically suspected viral diarrhea, 31 % were found to be positive for rotavirus antigen in their stool samples. A large number of studies conducted in India regarding rota virus diarrhea have been hospital based studies which have shown positivity of 34%.[51]

A study conducted in Nepal showed similar findings, with rotavirus antigen being demonstrated in 38.7% by Enzyme Immuno Assay.[52]

In a study by Ramani S in 2007 conducted in South India, rota virus positivity rates varied greatly between different settings- diarrhea hospitalisations(20%) , neonatal infections (35%) , symptomatic and asymptomatic infections in the community (15.1% and 6.3% respectively) and nosocomial infections (22.5%).[53]

Age distribution

Most of the studies in India have studied rota virus infection in children in less than 5 years, very few studies have taken a cohort of children less than 3 years. In our study, chiIdren less than 3 years were sampled. We had 50 children in the age group of 7-12 months out of which 25 were positive for rotavirus.

Our study showed significant association between age groups and rotavirus infection with 7-12 months accounting for 48% positivity, followed by 13-18 months with 30% positivity. A short term study of diarrhea among children under 5 years of age, conducted at Chennai also showed similar findings, with maximum incidence of rotavirus diarrhea observed among 7-12 months group.[5]

In a multi centric study conducted by Kang et al under The Indian Rotavirus Strain Survaillance Network with 4 laboratories and 10 hospitals in 7 different regions of India, rota virus detection rates were greatest among children aged 6-24 months.[54]

Our study is consistent with the study conducted by Department of Paediatric and Child Health, Department of Biochemistry and Department of Microbiology, Bugando Medical Centre, Tanzania which states that the highest incidence of rota viral diarrhea occurred in children aged 6 to 12 months and is similar to the incidence in other developing countries where rotavirus is a significant pathogen among infants less than 12 months.[55]

Sex distribution

In our study, there were 69 females (41.1%) and 99 males (58.9%)

There was no significant association between positivity of rota virus and gender, finding being similar to other studies.

Association with clinical features

All children in the study presented with loose stools, 137 (81.5%) presented with vomiting, 164 (97%) presented with fever, 16.7% presented with peri anal excoriation and 28% with URTI.

As noted by other studies, rotavirus infection in our study is seen to be associated with fever, vomiting, cough, coryza and peri anal excoriation[56,57].

All clinical features are significantly associated with rotavirus infection.

Association with type of dehydration

Out of 52 cases of rotaviral diarrhea, 5(9.6%) presented with mild dehydration, 21 (40.4%) presented with moderate dehydration and 26 (50%) presented with severe dehydration. Our study showed significant association between type of dehydration and rotaviral diarrhea with half of children presenting with severe dehydration.

Association with type of feeding

Out of 52 cases of positive rotavirus ELISA,

5(15%) children were exclusively breast fed (breast feeding alone).

37(43%) children were on supplementary feeding (breast feeding with cereal diet).

2 (25%)children were top fed (no breast feeding, only top milk).

8(19%) children were on family diet.

There was significant association seen between type of feeding and Rota virus infection with 43% babies on supplementary feeding.

The factors determining the feeding practices are not random between the breastfed and non-breastfed infants. We may therefore be observing the impact of the supplementary feeds on the risk of rotavirus diarrhea rather than the breastfeeding itself.

Glass R et al [58] made a similar observation in the study where he observed an increased risk to rotavirus in infants 6-11 months who were on supplementary breastfeeding.

Association with nutritional status

In our study 66 % children were normally nourished, 21 % were Grade I malnourished, 11% were grade II malnourished and 1% were grade III malnourished.

Using the weight for age chart by IAP, there was no statistically significant difference in rota virus infection proportions among children with normal nourishment and children with under nourishment.

This finding confirms that rota virus diarrhea can affect children under 5 years regardless of their nutritional status and protection is determined by acquired immunity from prior exposure to rota virus infection or vaccination against rota virus.[59,60]

Association with stool bacteriological culture

Out of 168 stool samples collected, 126 (75%) had no isolation of any enteropathogenic organism, whereas 42 samples were positive for bacterial stool culture(30 positive for Ecoli,6 positive for Klebsiella,3 positive for Citrobacter,2 positive for Proteus,and 1 positive for Shigella).

Our study showed 32 % mixed infection(stool culture positive for bacteria along with positive Rotavirus ELISA).

It is comparable to a study conducted at Kolkata to evaluate the emerging trends in the etiology of enteric pathogens.[61]

With all the discussed associations of rotavirus infections, our study corroborated the findings of most other studies which showed that rotavirus is a disease with very high morbidity and high socio economic implications in terms of medical costs and time spent in hospital. However no mortality was encountered in the study.

SUMMARY

Our study was a hospital based observational study to determine the incidence of rota viral diarrhea among the clinically suspected cases of acute viral diarrhea in our hospital setting. Only children less than 3 years (1-36 months) presenting with symtoms of acute viral diarrhea were considered for the study. History and clinical examination and relevant details were recorded and analysed to know the clinical features, feeding practises, stool culture positivity and rota virus ELISA positivity with reference to rota viral diarrhea.

The following conclusions could be drawn from our study:

1. A total of 168 stool samples were collected, out of which 99(58.9%) were male and 69 (41.1%)were female.
2. 31% children presenting with features of acute viral diarrhea tested positive for Rota Virus ELISA (Hospital incidence of rota viral diarrhea was found to be 31 %)
3. There was no significant association between gender, grade of malnutrition, mixed infections and rota virus diarrhea.
4. There was significant association noted between the age groups and rota virus infection with 48% of positive cases seen in the age group of 7 to 12 months.
5. Our study found to have significant association between type of feeding and rota

virus infection with 43% positivity seen in children with supplementary feeding.

6. Our study shows that apart from loose stools, fever, vomiting and dehydration , Rotavirus infection is associated with URTI and peri anal excoriation.

7. There is significant association between type of dehydration and rota virus infection with 50% of positive cases presenting with severe dehydration.

8. Our study showed 25% stool culture positivity for bacterial pathogens like E.coli (70%), Klebsiella (24), Citrobacter (0%), Proteus (6%), Shigella (0%), accounting for 32 % mixed infections(Stool culture positive for bacterial pathogen along with positive Rotavirus ELISA)

CONCLUSION

Our study concludes that there is substantial morbidity associated with rota virus diarrhea with hospital incidence of 31%. It highlights the importance of young age & feeding practises in the causation of rota virus infection. The only draw back of the study was that it looked at the incidence of hospitalisation and not the disease and these numbers do not represent the true incidence of rota virus disease.

Our study indicates substantial burden of rota viral disease in children less than 3 years (1-36 months) of age and emphasises the need for effective interventions for control of rota viral disease. Introducing Rota Virus Vaccine in to the Universal Immunisation Programme, along with adequate surveillance, would considerably reduce the diarrhea morbidity and mortality.

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ANNEXURES

BLDEA'S Shri B.M.Patil Medical college, Hospital & Research centre.

Bijapur-586103

RESEARCH INFORMED CONSENT FORM

TITLE OF THE STUDY :		TO STUDY THE CLINICAL PROFILE OF ACUTE VIRAL DIARRHEA IN CHILDREN IN THE AGE GROUP 1 MONTH TO 36 MONTHS WITH SPECIAL REFERENCE TO ROTA VIRAL DIARRHEA- AN OBSERVATIONAL STUDY.
GUIDE	:	Dr. S. V. PATIL, MD PROFESSOR AND HOD DEPARTMENT OF PEDIATRICS
CO- GUIDE	:	Dr. PRVEEN R.SHAHAPUR MD PROFESSOR, DEPARTMENT OF MICROBIOLOGY
P G STUDENT	:	Dr. SHRUTI V. SORAGAVI

PURPOSE OF RESEARCH:

I have been informed that the present study will help in assessing the clinical profile of acute viral diarrhea in children and thus helping in better treatment.

PROCEDURE:

I understand that after having obtained clinical history, thorough clinical examination and relevant investigations, a final workup for identification of Rota virus antigen in stool specimens is carried out and appropriate management is planned.

RISK AND DISCOMFORTS:

I understand that my child may experience some discomfort during the examination or during treatment. This is mainly the result of my condition and the procedures of this study are not expected to exaggerate these feelings which are associated with the usual course of treatment.

BENEFITS:

I understand that my child's participation in the study will have no direct benefit to me other than the potential benefit of the treatment.

COFIDENTIALITY:

I understand that the medical information produced by this study will become a part of hospital records and will be subject to the confidentiality. Information of sensitive personal nature will not be part of the medical record, but will be stored in the investigation research file.

If the data are used for publication in the medical literature or for teaching purpose,no name will be used and other identifiers such as photographs will be used only with special written permission. I understand that I may see the photograph before giving the permission.

REQUEST FOR MORE INFORMATION:

I understand that I may ask more questions about the study at anytime and Dr Shruti V.Soragavi at the department of pediatrics is available to answer my questions or concerns. I understand that I will be informed of any significant new findings discovered during the course of the study, which might influence my continued participation. A copy of this consent form will be given to me for careful reading.

REFUSAL FOR WITHDRAWAL OF PARTICIPATION:

I understand that my participation is voluntary and that I may refuse to participate or may withdraw consent and discontinue participation in the study at any time without prejudice. I also understand that Dr. Shruti V. Soragavi may terminate my participation in the study after she has explained the reasons for doing so.

INJURY STATEMENT:

I understand that in my unlikely event of injury to my child resulting directly from participation in this study, if such injury were reported promptly, the appropriate treatment would be available to me. But, no further compensation would be provided by the hospital. I understand that by my agreements to participate in the study and not waiving any of my legal rights.

I have explained to ---------- the purpose of the research, the procedures and the possible risks to the best of my ability.

Dr.Shruti V. Soragavi Date

(Investigator)

STUDY SUBJECT CONSENT STATEMENT

I confirm that Dr Shruti V Soragavi has explained to me the purpose of research, the study procedure, that I am willing to allow my child to undergo the investigation and the possible discomforts as well as benefits. I have been explained all the above in detail in my own language and I understand the same. Therefore I agree to give consent to participate as a subject in this research project.

---------- ----------

(Participant) Date

---------- ----------

(witness to signature) Date

SCHEME OF CASE TAKING

Name :

Age :

Sex :

IP No :

DOA :

DOD :

Residence :

Occupation & Income Of parents :

Chief Complaints and History of presenting Illness:

1. History of loose stools yes/no
2. History of vomiting yes/no
3. History of low grade fever yes/no

Past history:

History of repeated episodes of diarrhea yes/no

Family history:

Other siblings having similar episodes of diarrhea Yes/no

Diet and feeding History:

Whether exclusively breastfeed? Yes/no

On supplementary feeding? Yes/no

Consumtion of outside food? Yes/no

History suggestive of intercurrent infection? Yes/no

Immunisation history Yes/no

General Physical Examination:

Anthropometry :

Head to toe :

Vitals :

Systemic examination

CVS:

RS:

PA:

CNS:

Provisional Diagnosis:

Investigations:

Stool routine and microscopy

Stool culture

Special Investigations:

Rapid ELISA test

Serum electrolytes

Final Diagnosis:

ETHICAL CLEARANCE CERTIFICATE

Eth col Committee BIJAPUR-586103 OUT WARD No 271/2011 Date 21-10-11 BLDE's Shri B. M. Patil Medical College

B.L.D.E. UNIVERSITY'S
SHRI.B.M.PATIL MEDICAL COLLEGE, BIJAPUR-586 103
INSTITUTIONAL ETHICAL COMMITTEE

INSTITUTIONAL ETHICAL CLEARANCE CERTIFICATE

The Ethical Committee of this college met on 20-10-2011 *at* 10-30 am *to scrutinize the Synopsis/Research projects of postgraduate/undergraduate student/Faculty members of this college from Ethical Clearance point of view. After scrutiny the following original/corrected & revised version synopsis of the Thesis/Research project has been accorded Ethical Clearance.*

Title "Study of clinical profile of acute viral diarrhea in children in the age group 1 month to 36 months with special reference to rota viral diarrhea"

Name of P.G./U.G. student/Faculty member Dr. Shruti. V. Sorgavi
Dept of Pediatrics

Name of Guide/Co-investigator Dr. S.V. Patil Prof & HOD, Pediatrics

DR.M.S.BIRADAR,
CHAIRMAN
INSTITUTIONAL ETHICAL COMMITTEE
BLDEU'S, SHRI.B.M.PATIL
MEDICAL COLLEGE, BIJAPUR.

Chairman
Ethical Committee
BLDEA'S Shri. B.M. Patil
Medical College
Bijapur-586103

Following documents were placed before E.C. for Scrutinization
1) Copy of Synopsis/Research project.
2) Copy of informed consent form
3) Any other relevant documents.

KEY TO MASTER CHART

PE	: Perianal excoriation
URTI	: Upper respiratory tract infection
EBF	: Exclusive Breast Feeding
SF	: Supplementary Feeding
TF	: Top feeding
FD	: Family diet
N	: Normal
PC	: Pus Cells
RS	: Reducing Substance
NEG	: Negative
MOD	: Moderate
+	: Present
++	: Moderately Present
+++	: Severely Present

SL. No	NAME	AGE (months)	SEX	IP NO.	CLINICAL FEATURES					PAST HISTORY OF REPEATED DIARRHOEA	FEEDING	
					LOOSE STOOLS	VOMITING	FEVER	OTHERS	INTERCURRENT INFECTIONS		EBF	SF
1	ANAND	10	MALE	13116	6 TO 8	3 TO 4	HIGH	NO	URTI	NO		+
2	AUSHKA	17	F	15064	8 TO 10	6 TO 8	HIGH	NO	NO	NO		+
3	BHUVANA	9	F	15078	+	4 TO 8	MOD	NO	NO	NO		+
4	SUDEEP	10	MALE	12854	+	+	MOD	PE	URTI	NO		
5	VITTAL	12	MALE	12987	+	+	MOD	NO	NO	NO		+
6	BHAGYA	6	F	12931	++	++	HIGH	PE	URTI	NO	+	
7	HASINA	7	MALE	16054	+++	NO	HIGH	NO	ANEMIA	NO		+
8	BHADURSINGH	12	MALE	16095	+	++	MOD	NO	NO	YES		+
9	BHAGYALAKSHMI	6	F	12931	++	+++	HIGH	NO	URTI	NO	+	
10	SOMNATH	12	MALE	14621	+++	NO	LOW	NO	NO	NO		+
11	ADITYA	24	MALE	13491	++	++	HIGH	NO	NO	NO		
12	AKHILESH	13	MALE	15848	+++	+++	MOD	PE	URTI	NO		+
13	SHRADDA	24	F	15692	+++	+	HIGH	NO	NO	NO		
14	REKHA	24	F	13509	+	+	LOW	NO	NO	NO		
15	VARUN	8	MALE	13685	+	+++	HIGH	NO	NO	NO		+
16	TOHITH	7	MALE	14107	++	++	MOD	PE	NO	NO		+
17	SAGAR	24	MALE	13022	++	++	MOD	NO	NO	NO		+
18	RUTUJA	10	F	13031	++	++	HIGH	NO	NO	NO		+
19	IRFAN	12	MALE	13115	++	++	MOD	NO	NO	NO		+
20	BOURAMMA	12	F	15401	++	++	MOD	NO	NO	YES		+
21	PARASHURAM	10	MALE	15611	++	+++	HIGH	PE	NO	NO		+
22	SHRADDHA	24	F	15692	+	+	MOD	NO	NO	NO		

SL. No	NAME	AGE (months)	SEX	IP NO.	CLINICAL FEATURES					PAST HISTORY OF REPEATED DIARRHOEA	FEEDING	
					LOOSE STOOLS	VOMITING	FEVER	OTHERS	INTERCURRENT INFECTIONS		EBF	SF
23	SHRUSHTI	12	F	15865	+++	+++	HIGH	PE	URTI	NO		+
24	SPPORTHI	8	F	15866	++	++	MOD	NO	NO	NO		+
25	MANNU	36	MALE	16018	++	++	MOD	NO	NO	NO		
26	HASINA	24	F	16054	+	+	LOW	NO	NO	NO		
27	SNEHA	3	F	16075	++	+	MOD	NO	NO	NO	+	
28	TEJAS	5	MALE	16967	+++	+++	MOD	NO	NO	NO		+
29	ABHISHEK	5	MALE	17145	++	++	HIGH	NO	NO	NO	+	
30	TANVITHA	9	F	17651	++	++	HIGH	PE	URTI	NO		+
31	ABHISHEK	7	MALE	16855	+	+	MOD	NO	NO	NO		+
32	LAKSHMI	12	F	17025	+	++	MOD	NO	NO	NO		+
33	ANISA	12	F	17691	+++	++	MOD	NO	LRTI	NO		+
34	ROHIT	24	MALE	17764	++	++	HIGH	NO	NO	NO		
35	JYOTHI	10	F	17883	++	++	MOD	NO	NO	NO		+
36	MALLIKARJUN	12	MALE	17889	+++	+++	HIGH	PE	NO	NO		+
37	SAYANA	12	F	17998	++	++	HIGH	PE	NO	NO		+
38	ADITYA	3	MALE	15034	++	++	MOD	NO	NO	NO	+	
39	PRASANNA	8	MALE	15779	+	-	MOD	NO	NO	NO		+
40	GANGAYYA	12	MALE	15898	++	++	MOD	NO	NO	NO		+
41	SOMSHEKHAR	12	MALE	17564	+++	++	HIGH	NO	NO	NO		+
42	BAYAPPA	36	MALE	18450	++	++	HIGH	NO	NO	NO		
43	SUREKHA	12	F	18586	++	++	MOD	NO	NO	NO		+
44	RASHI	12	F	18432	++	++	MOD	NO	NO	NO		+

SL. No	NAME	AGE (months)	SEX	IP NO.	CLINICAL FEATURES					PAST HISTORY OF REPEATED DIARRHOEA	FEEDING	
					LOOSE STOOLS	VOMITING	FEVER	OTHERS	INTERCURRENT INFECTIONS		EBF	SF
45	NAVYA	12	F	18616	++	-	MOD	NO	URTI	NO		+
46	DIVYA	24	F	18667	++	+++	MOD	NO	NO	NO		
47	TARUN	24	MALE	18385	++	-	LOW	NO	NO	NO		
48	PRANAM	3	MALE	18869	++	+	MOD	NO	NO	NO	+	
49	JYOTHI	12	F	18957	++	+	MOD	NO	NO	NO		+
50	VANISHREE	11	F	19125	++	-	MOD	NO	NO	YES		+
51	MANGALA	3	F	18054	+	-	LOW	NO	NO	NO	+	
52	ADITYA	36	MALE	18034	++	++	MOD	NO	NO	NO		
53	PRASANNA	8	MALE	18337	++	+++	HIGH	PE	LRTI	NO	+	
54	APPU	24	MALE	18376	++	+	MOD	NO	NO	NO		
55	RAVICHANDRA	12	MALE	18557	++	++	MOD	NO	NO	NO		+
56	DIVYA	24	F	18667	++	-	HIGH	NO	NO	NO		
57	SIDDHARTH	3	MALE	18704	+++	+++	HIGH	PE	URTI	NO	+	
58	BHUVANA	3	MALE	19028	++	++	MOD	NO	NO	NO	+	
59	SHUBHAM	12	MALE	18640	+++	+	MOD	NO	NO	NO		+
60	ABHIJEET	5	MALE	19336	+++	-	HIGH	NO	NO	NO	+	
61	HARIPRIYA	12	F	19618	++	++	HIGH	NO	NO	NO		+
62	SHIVAPAD	9	MALE	26386	++	+++	MOD	NO	URTI	NO		+
63	MONESH	6	MALE	27156	++	-	LOW	NO	NO	NO		
64	SAMIR	11	MALE	27974	++	+++	HIGH	PE	NO	YES		+
65	SAI PREM	8	MALE	29676	++	-	LOW	NO	NO	NO		+

SL. No	NAME	AGE (months)	SEX	IP NO.	CLINICAL FEATURES					PAST HISTORY OF REPEATED DIARRHOEA	FEEDING	
					LOOSE STOOLS	VOMITING	FEVER	OTHERS	INTERCURRENT INFECTIONS		EBF	SF
66	RENUKA	24	F	29934	++	++	MOD	NO	NO	NO		
67	MALLIVAR	36	MALE	25305	+	+	LOW	NO	NO	NO	+	
68	SOUMYA	12	F	27549	++	++	MOD	NO	NO	NO		+
69	CHETAN	24	MALE	27597	++	++	MOD	NO	NO	NO		
70	SAMEED	11	MALE	27974	+++	+	MOD	PE	LRTI	NO		+
71	RAMESH	5	MALE	28173	+	+	MOD	NO	NO	NO	+	
72	REVANSIDDHA	36	MALE	28357	++	++	LOW	NO	NO	NO		
73	BHUMIKA	12	F	28283	+	+	LOW	NO	NO	NO		+
74	SANGEETA	12	F	28375	+	+++	HIFH	NO	NO	NO		
75	AKKAWWA	11	F	28510	++	++	MOD	NO	LRTI	YES		+
76	VISHAL	9	MALE	28564	+	-	MOD	NO	NO	NO		+
77	GANGAPPA	9	MALE	28772	+++	++	MOD	PE	LRTI	NO		
78	ISHWAR	3	MALE	28534	++	++	MOD	NO	NO	NO	+	
79	ANIL	14	MALE	34218	+	+	LOW	NO	NO	NO		+
80	SAWAN	9	MALE	29458	++	++	MOD	NO	NO	NO	+	+
81	TIPPANNA	24	MALE	29776	+++	+++	HIGH	NO	URTI	YES		
82	RENUKA	24	F	29752	++	++	MOD	NO	NO	NO		
83	TANVEER	24	MALE	30596	++	+	LOW	NO	NO	NO		+
84	vaishnavi	12	F	904	+++	++	HIGH	PE	URTI	NO		+
85	PRERNA	8	F	1066	++	++	HIGH	NO	NO	NO		+
86	B/O MEENA	3	F	677	+++	-	MOD	PE	LRTI	NO	+	

SL. No	NAME	AGE (months)	SEX	IP NO.	CLINICAL FEATURES					PAST HISTORY OF REPEATED DIARRHOEA	FEEDING	
					LOOSE STOOLS	VOMITING	FEVER	OTHERS	INTERCURRENT INFECTIONS		EBF	SF
87	ANASUYA	18	F	6396	++	+	MOD	NO	NO	NO		
88	SHROJAN	10	MALE	6764	++	+	MOD	NO	URTI	NO		+
89	GOUTAMI	12	F	8513	+++	+	LOW	NO	NO	NO		+
90	KARIAPPA	36	MALE	8821	++	-	MOD	NO	NO	NO		
91	ADITYA	12	MALE	10148	++	-	MOD	NO	NO	YES		+
92	SHREYA	8	F	11352	+++	++	HIGH	NO	URTI	NO		+
93	HAMIDA	5	F	12316	++	-	MOD	NO	NO	NO	+	
94	SARIKA	12	F	13642	++	++	HIGH	NO	LRTI	NO		
95	MALLU	12	MALE	14506	++	+	MOD	NO	NO	NO		+
96	SUNIL	7	MALE	24587	+++	+++	MOD	NO	URTI	NO		+
97	SAMPAT	10	MALE	31556	+	+	LOW	NO	NO	NO		+
98	AMOGH	12	MALE	31890	++	++	MOD	NO	NO	NO		+
99	AMOGSIDDHA	12	MALE	31990	+	++	MOD	NO	NO	YES		+
100	MALLIKARJUN	10	MALE	35282	+++	+++	HIGH	PE	URTI	NO		+
101	SHREYA	36	F	35728	++	-	MOD	NO	NO	NO		
102	GINGABAI	24	F	36442	+++	++	MOD	NO	NO	NO		
103	RAGHAVENDRA	36	MALE	42644	+	+	LOW	NO	NO	NO		
104	B/O MADHURI	3	F	53755	++	-	LOW	NO	NO	NO	+	
105	PREM	12	MALE	53776	+++	++	MOD	PE	LRTI	NO		+
106	B/O REKHA	3	MALE	59013	++	+	LOW	NO	URTI	NO	+	

SL. No	NAME	AGE (months)	SEX	IP NO.	CLINICAL FEATURES					PAST HISTORY OF REPEATED DIARRHOEA	FEEDING	
					LOOSE STOOLS	VOMITING	FEVER	OTHERS	INTERCURRENT INFECTIONS		EBF	SF
107	BASU	24	MALE	59015	++	-	MOD	NO	NO	NO		
108	HARISH	36	MALE	60803	+++	+++	HGH	NO	LRTI	NO		
109	SINCHANA	24	F	63118	+++	+++	HIGH	NO	URTI	YES		
110	RITIKA	24	F	63224	++	+	LOW	NO	NO	NO		
111	AHMED	36	MALE	66372	++	++	MOD	NO	URTI	NO		
112	PRITHAM	12	MALE	66691	++	-	LOW	NO	NO	NO		+
113	LAXMI	3	F	69487	++	++	MOD	NO	NO	NO	+	
114	PRITHVI	6	MALE	69889	+++	++	MOD	PE	URTI	NO	+	
115	RAKESH	36	MALE	70531	+	+	LOW	NO	NO	NO		
116	SHUBHAM	36	MALE	72823	++	++	MOD	NO	NO	NO		
117	BHAGAMMA	24	F	74947	+++	+++	HIGH	NO	URTI	NO		
118	SPOORTHI	30	F	75175	++	++	LOW	NO	NO	NO		
119	BHAGYA	12	F	77390	++	+++	MOD	PE	URTI	NO		+
120	SATISH	12	MALE	77627	+++	++	HIGH	NO	URTI	NO		+
121	MUTTURAJ	24	MALE	80768	++	-	LOW	NO	NO	NO		
122	KAVERI	36	F	82098	+	+	NO	NO	NO	NO		
123	IRANNA	34	MALE	86304	++	++	LOW	NO	NO	NO		
124	SOMNATH	11	MALE	86474	+++	+++	HIGH	PE	NO	NO		+
125	TRISHA	9	F	99044	++	-	NO	NO	NO	NO		+
126	ARADYA	6	F	94958	++	++	LOW	NO	NO	NO	+	
127	ROHIT	6	MALE	545	++	+	HIGH	NO	NO	NO	+	
128	SOUMYA	10	F	964	++	++	LOW	NO	URTI	NO		+

SL. No	NAME	AGE (months)	SEX	IP NO.	CLINICAL FEATURES					PAST HISTORY OF REPEATED DIARRHOEA	FEEDING	
					LOOSE STOOLS	VOMITING	FEVER	OTHERS	INTERCURRENT INFECTIONS		EBF	SF
129	AISHWARYA	12	F	1972	+++	++	HIGH	NO	LRTI	NO		+
130	SHIVALEELA	12	F	2161	++	++	MOD	NO	NO	NO		+
131	AJAY	36	MALE	2333	++	+	LOW	NO	NO	NO		
132	ANAND	12	MALE	1814	+	+	MOD	NO	NO	NO		+
133	ASAD	12	MALE	3740	++	+	LOW	PE	URTI	NO		+
134	SHRIPAVAN	24	MALE	5937	+++	++	MOD	NO	NO	NO		
135	SAMRUDHI	7	F	6705	+++	++	MOD	NO	URTI	NO		+
136	PRADEEP	4	MALE	2791	++	++	LOW	PE	NO	NO	+	
137	VAISHNAVI	9	MALE	2875	+	-	LOW	NO	NO	NO		+
138	DANAMMA	12	F	3153	++	+	MOD	NO	NO	NO		+
139	SHASHIKUMAR	14	MALE	4408	++	++	HIGH	NO	NO	YES		+
140	VARSHA	10	F	4971	++	+	MOD	NO	NO	NO		
141	DEVENDRA	36	MALE	7084	++	-	MOD	NO	NO	NO		
142	TANUSHREE	7	F	9427	+++	++	MOD	PE	URTI	NO		+
143	GIRISH	10	MALE	9623	+++	-	HIGH	NO	NO	NO		+
144	MONNESH	4	MALE	10238	++	++	MOD	PE	NO	NO	+	
145	NANDITA	24	F	10247	+++	+	MOD	NO	NO	NO		
146	SAMARTH	24	MALE	5069	++	++	MOD	NO	NO	NO		
147	POOJA	10	F	6611	++	++	HIGH	NO	URTI	NO		+
148	SANJANA	12	F	6610	+++	-	MOD	NO	NO	NO		+
149	SAMARTH	12	MALE	10033	+	+	MOD	NO	NO	NO		
150	SUNIL	4	MALE	10357	++	+	MOD	PE	URTI	NO	+	

SL. No	NAME	AGE (months)	SEX	IP NO.	CLINICAL FEATURES					PAST HISTORY OF REPEATED DIARRHOEA	FEEDING	
					LOOSE STOOLS	VOMITING	FEVER	OTHERS	INTERCURRENT INFECTIONS		EBF	SF
151	ANNAPURNA	24	F	10445	+++	++	LOW	NO	NO	NO		
152	SUPRIYA	6	F	10916	+	+	LOW	NO	NO	NO	+	
153	PRAJWAL	6	MALE	10678	+++	++	HIGH	NO	LRTI	NO		
154	NIYAD	36	MALE	10728	++	-	MOD	NO	NO	NO		
155	ADITYA	24	MALE	15928	+++	+	LOW	NO	URTI	NO		
156	RAMESH	36	MALE	18343	++	++	MOD	NO	NO	NO		
157	NAVEEN	12	MALE	18539	++	-	LOW	NO	NO	NO		+
158	PRIYA	4	F	11109	+	+	LOW	NO	URTI	NO	+	
159	RAJEEV	8	MALE	11110	+++	++	HIGH	PE	NO	NO		+
160	SHRADDHA	12	F	11117	++	+	LOW	NO	NO	NO		+
161	PREMA	12	F	13248	+++	-	MOD	NO	LRTI	NO		+
162	VINAYAK	7	MALE	13865	+	++	LOW	NO	NO	NO	+	
163	UDAY	9	MALE	15336	+++	+++	HIGH	PE	URTI	NO		+
164	MANNU	36	MALE	16018	++	-	MOD	NO	NO	NO		
165	SAKSHI	3	F	25676	+++	+	LOW	NO	NO	NO	+	
166	VARUN	12	MALE	26560	++	-	MOD	NO	URTI	NO		+
167	ANAND	10	MALE	26813	+++	+++	HIGH	NO	LRTI	NO		+
168	FEHAD	24	MALE	27401	+	+++	MOD	NO	NO	NO		

HISTORY		IMMUNISED WITH ROTAVIRUS VACCINE	ANTHROPOMETRY		DEHYDRATION			INVESTIGATIONS		
TF	FD		WT	IAP GRADE	NO	MODERATE	SEVERE	STOOL ROUTINE	STOOL CULTURE	ROTA VIRUS ELISA
		NO	7	N		+		N	N	NEG
		NO	9.3	N			+	PUS CELLS	E.COLI	NEG
		NO	6.9	I	+			N	N	NEG
+		NO	7.6	I			+	PC	E.COLI	POSITIVE
+		NO	8	N			+	N	N	NEG
		NO	5.5	II		+		PC	N	POSITIVE
		NO	5	II			+	PUS CELLS	N	POSITIVE
		NO	9	N		+		N	N	NEG
		NO	5	II		+		N	N	NEG
		NO	8	N		+		N	E.COLI	NEG
		NO	10	N		+		PUS CELLS	N	NEG
		NO	7	I			+	PUS CELLS	N	POSITIVE
		NO	9	I		+		PUS CELLS	citro	NEG
		NO	10	N	+			N	N	NEG
		NO	6.3	I		+		N	N	POSITIVE
		NO	6.6	I	+			N	N	POSITIVE
		NO	10	N		+		N	N	NEG
		NO	6.4	II		+		N	N	NEG
		NO	8	N		+		N	N	NEG
		NO	8.6	N			+	PUS CELLS	E.COLI	NEG
		NO	7	N			+	N	N	POSITIVE
		NO	9	I	+			N	N	POSITIVE

HISTORY		IMMUNISED WITH ROTAVIRUS VACCINE	ANTHROPOMETRY		DEHYDRATION			INVESTIGATIONS		
TF	FD		WT	IAP GRADE	NO	MODERATE	SEVERE	STOOL ROUTINE	STOOL CULTURE	ROTA VIRUS ELISA
		NO	8	N			+	PUS CELLS	E.COLI	POSITIVE
		NO	7	N	+			N	N	NEG
		NO	11	I	+			N	N	NEG
		NO	10	N	+			N	N	NEG
		NO	4.5	N		+		N	N	NEG
		NO	5.4	I		+		N	N	POSITIVE
		NO	6	I		+		PUS CELLS	ECOLI	NEG
		NO	7.6	N		+		N	N	POSITIVE
		NO	5.6	I	+			N	N	POSITIVE
		NO	8.6	N		+		N	N	NEG
		NO	8	N		+		N	E.COLI	NEG
	+	NO	9	I		+		N	N	POSITIVE
		NO	7	N		+		N	N	NEG
		NO	6	II			+	N	N	POSITIVE
		NO	8	N			+	N	N	POSITIVE
		NO	4	II		+		PUS CELLS	N	NEG
		NO	6.4	I	+			N	N	NEG
		NO	8.4	N				N	N	NEG
		NO	9	N		+		N	N	NEG
	+	NO	12	N		+		PUS CELLS	citro	NEG
		NO	8.4	N			+	PUS CELLS	N	POSITIVE
		NO	8	N		+		N	N	NEG

HISTORY		IMMUNISED WITH ROTAVIRUS VACCINE	ANTHROPOMETRY		DEHYDRATION			INVESTIGATIONS		
TF	FD		WT	IAP GRADE	NO	MODERATE	SEVERE	STOOL ROUTINE	STOOL CULTURE	ROTA VIRUS ELISA
		NO	7	I		+		N	N	POSITIVE
	+	NO	9	I		+		PUS CELLS	E.COLI	POSITIVE
	+	NO	9.4	I		+		N	N	NEG
		NO	4	II		+		RS, PC	N	NEG
		NO	8.6	N			+	N	E.COLI	NEG
		NO	8.2	N		+		N	N	NEG
		NO	4	N	+			N	E.COLI	NEG
	+	NO	12	N				N	N	NEG
		NO	8.2	N			+	N	N	POSITIVE
	+	NO	8	II		+		N	N	NEG
		NO	7.6	I		+		PUS CELLS	E.COLI	NEG
	+	NO	10	N		+		PUS CELLS	E.COLI	NEG
		NO	4.5	N		+		RS, PC	E.COLI	POSITIVE
		NO	4	N	+			N	E.COLI	NEG
		NO	6	II		+		PC	KLEBSIELLA	POSITIVE
		NO	5	II			+	PC,RS	E.COLI	NEG
		NO	8.9	N		+		N	E.COLI	POSITIVE
		NO	8	N			+	N	N	NEG
+		NO	5	II		+		PC	E.COLI	NEG
		NO	8.8	N			+	PC	N	POSITIVE
		NO	8	N		+		N	N	NEG

HISTORY		IMMUNISED WITH ROTAVIRUS VACCINE	ANTHROPOMETRY		DEHYDRATION			INVESTIGATIONS		
TF	FD		WT	IAP GRADE	NO	MODERATE	SEVERE	STOOL ROUTINE	STOOL CULTURE	ROTA VIRUS ELISA
	+	NO	10	N	+			PC	E.COLI	NEG
		NO	12	N	+			N	N	NEG
		NO	9.6	N		+		N	N	NEG
	+	NO	10	N		+		N	N	NEG
		NO	8.9	II			+	N	E.COLI	POSITIVE
		NO	5.6	II		+		N	N	NEG
	+	NO	13	N	+			N	N	NEG
		NO	10	N	+			N	N	NEG
	+	NO	8.8	N		+		PC	N	POSITIVE
		NO	7.9	I		+		PC	E.COLI	NEG
		NO	8.2	N		+		N	N	NEG
	+	NO	8	N		+		PC,RS	N	NEG
		NO	4	N		+		N	N	NEG
		NO	8	I	+			N	N	NEG
		NO	7.6	N		+		N	N	POSITIVE
	+	NO	8	I			+	PC	E.COLI	POSITIVE
	+	NO	9.6	I		+		N	N	NEG
		NO	10	N	+			N	N	NEG
		NO	8.7	N			+	PUS CELLS	N	POSITIVE
		NO	6	II		+		N	N	POSIYIVE
		NO	4.2	N			+	PC,RS	KLEBSIELLA	POSITIVE

HISTORY		IMMUNISED WITH ROTAVIRUS VACCINE	ANTHROPOMETRY		DEHYDRATION			INVESTIGATIONS		
TF	FD		WT	IAP GRADE	NO	MODERATE	SEVERE	STOOL ROUTINE	STOOL CULTURE	ROTA VIRUS ELISA
	+	NO	10	N		+		N	N	NEG
		NO	9.4	N		+		N	E.COLI	POSITIVE
		NO	8.5	N		+		N	E.COLI	NEG
	+	NO	12	N	+			N	N	NEG
		NO	9	N		+		N	N	NEG
		NO	6	I			+	N	N	POSITIVE
		NO	5	I		+		N	N	NEG
+		NO	8.8	N		+		PC	KLEBSIELLA	NEG
		NO	9	N	+			N	N	NEG
		NO	7.5	N			+	PC	KLEBSIELLA	POSITIVE
		NO	8.6	N		+		N	N	NEG
		NO	7	I		+		N	N	NEG
		NO	9.3	N		+		PC	KLEBSIELLA	NEG
		NO	7.8	N			+	N	N	POSITIVE
	+	NO	13	N		+		N	N	NEG
	+	NO	10	N		+		N	N	NEG
	+	NO	11	I		+		N	N	NEG
		NO	4	N	+			PC,RS	N	NEG
		NO	9.3	N			+	PC	E.COLI	POSITIVE
		NO	5	N	+			N	N	NEG

HISTORY		IMMUNISED WITH ROTAVIRUS VACCINE	ANTHROPOMETRY		DEHYDRATION			INVESTIGATIONS		
TF	FD		WT	IAP GRADE	NO	MODERATE	SEVERE	STOOL ROUTINE	STOOL CULTURE	ROTA VIRUS ELISA
	+	NO	12	N		+		N	N	NEG
	+	NO	12.8	N			+	PC	N	NEG
	+	NO	8	II			+	PC	N	POSITIVE
+		NO	6.8	III		+		N	N	NEG
	+	NO	12	N		+		PC	PROTEUS	POSITIVE
		NO	10	N	+			N	N	NEG
		NO	4.4	N	N	+		N	N	NEG
		NO	5.7	II		+		N	E.COLI	NEG
	+	NO	15	N	+			N	N	NEG
	+	NO	13.2	N		+		N	N	NEG
	+	NO	9	I			+	PC	E.COLI	POSITIVE
	+	NO	14	N		+		N	N	NEG
		NO	7.6	I		+		N	N	POSITIVE
		NO	9.6	N			+	PC	E.COLI	POSITIVE
	+	NO	12	N		+		N	N	NEG
	+	NO	15	N			+	n	n	NEG
	+	NO	13.8	N				N	N	NEG
		NO	7	I			+	PC	N	POSITIVE
		NO	8.9	N		+		N	N	NEG
		NO	6.4	N		+		N	N	NEG
		NO	5.4	I		+		N	N	NEG
		NO	9.6	N	+			PC	N	NEG

HISTORY		IMMUNISED WITH ROTAVIRUS VACCINE	ANTHROPOMETRY		DEHYDRATION			INVESTIGATIONS		
TF	FD		WT	IAP GRADE	NO	MODERATE	SEVERE	STOOL ROUTINE	STOOL CULTURE	ROTA VIRUS ELISA
		NO	9.4	N		+		N	N	POSITIVE
		NO	10	N		+		PC	E.COLI	NEG
	+	NO	13	N	+			N	N	NEG
		NO	10	N		+		N	N	NEG
		NO	9.6	N		+		N	N	NEG
	+	NO	9	I			+	PC,RS	N	POSITIVE
		NO	7.4	N		+		N	N	POSITIVE
		NO	5.4	N		+		N	N	NEG
		NO	8.9	N	+			N	N	NEG
		NO	8	N		+		N	N	NEG
		NO	10	N		+		N	N	POSITIVE
+		NO	9.8	N		+		N	N	NEG
	+	NO	14	N	+			N	N	NEG
		NO	6	I			+	PC,RS	N	POSITIVE
		NO	7	II		+		PC	SHIGELLA	NEG
		NO	4.4	N		+		N	N	NEG
	+	NO	9	I		+		N	N	NEG
	+	NO	11	N		+		PC	E.COLI	NEG
		NO	8	N			+	PC	N	POSITIVE
		NO	10	N		+		N	N	NEG
		NO	7.6	I	+			N	N	NEG
		NO	4.3	N		+		PC	N	NEG

HISTORY		IMMUNISED WITH ROTAVIRUS VACCINE	ANTHROPOMETRY		DEHYDRATION			INVESTIGATIONS		
TF	FD		WT	IAP GRADE	NO	MODERATE	SEVERE	STOOL ROUTINE	STOOL CULTURE	ROTA VIRUS ELISA
	+	NO	11	N			+	PC	citro	NEG
		NO	5	II	+			N	N	NEG
+		NO	4.4	III			+	PC	N	POSITIVE
	+	NO	15	N		+		N	N	NEG
	+	NO	12	N		+		N	N	NEG
	+	NO	14	N		+		PC	GIARDIA	NEG
		NO	8	II	+			N	N	NEG
		NO	4.3	N	+			N	N	NEG
		NO	7.2	I			+	PC,RS	E.COLI	POSITIVE
		NO	8	N	+			N	N	NEG
		NO	9	N		+		N	N	POSITIVE
		NO	8.8	N		+		N	N	NEG
		NO	8.2	N			+	PC	N	POSITIVE
	+	NO	15	N		+		N	N	NEG
		NO	4	N	+			RS, PC	N	NEG
		NO	7	I		+		N	N	NEG
		NO	7.4	I		+		N	KLEBSIELLA	POSITIVE
	+	NO	12	N		+		N	N	NEG