

Prevalence and Factors Associated with Rotavirus among Children Admitted with Acute Diarrhea

Thesis

Submitted for partial fulfillment of Master Degree in
Pediatrics

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2014

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وَعَلَّمَكَ مَا لَمْ تَكُن تَعْلَمُ
وَكَانَ فَضْلُ اللَّهِ عَلَيْكَ عَظِيمًا

صدق الله العظيم

سورة النساء: (113)

ACKNOWLEDGEMENT

I would like to express my deep gratitude to **Professor Dr. Hamed Mamoud Shatla, Professor of Pediatrics, Faculty of Medicine, Ain Shams University** for his generous supervision of my thesis. It would have been very difficult for me to accomplish this thesis without his kind and valuable advice and helpful guidance. In fact his constant encouragement from the beginning of my study has evaluated me to complete this task.

I would be very glad to express my great thanks, to **Dr. Marwa Talaat Eldeeb, Lecturer of Pediatrics, Faculty of Medicine - Ain Shams University**, for her strict supervision and big effort to complete this study, guiding me to focus on the point of this research.

I would like to express my deep gratitude to **Dr. Hoda Ezz El Arab**, and **Mr. Zaki Kamal Zaki**, for their sincere guidance and valuable instructions throughout this work.

I would avail this chance to extend my thanks to the staff members of **Pediatric Department, Faculty of Medicine-Ain Shams University**, Whom never have failed to render me every possible help to complete my work.

My great appreciation and thanks to my husband and my children (**Heba & Ali**) and my family for their help and patients for difficulties faced during the time of my study, the God, bless them.

Fawzia Abdel Salam



Abstract

Background: Rotavirus is the leading cause of severe diarrhea disease in infants and young children worldwide. About 600,000 children die every year from rotavirus, with more than 80% of all rotavirus-related deaths occurring in resource-poor countries in south Asia and sub-Saharan Africa. Rotavirus-related deaths represent approximately 5% of all deaths in children younger than 5 years of age worldwide. Dehydration and electrolyte disturbances are the major sequelae of rotavirus infection and occur most often in the youngest children. **Aim of the work:** The aim of present study is to determine the prevalence and factor associated with rotavirus diarrhea among Children aged under five year attending outpatient clinic in Ain –Shams University Childrens' Hospital. **Methods:** This is cross sectional study carried out on (30) infants Children age under <5year. Stool samples were collected from all (30) patients and tested for rotavirus antigen by means of PCR Rotavirus by real time PCR using Sybgreen I The prevalence of rotavirus infection among the 30 patients as detected by **Results:** PCR Rotavirus was 25 patients (83.33%): were PCR for Rota virus +ve and 5 patients (16.66%): were PCR for Rota virus -ve. **Conclusion:** Rotavirus causes about 30-50% of diarrheal diseases in young children and the prevalence of severe rotavirus disease has remained high despite improvements in sanitation. In the present study indicates that rotavirus was the cause of 25.9 % of the diarrhoeal cases studied and that rotavirus is a major public health problem in children under 5 years of age. These children can subsequently become sources of outbreaks. Increase incidence of Rotavirus infection encourages the uses of Rotavirus Vaccine to decrease burden.

Keywords: Rotavirus, prevalence, Diarrhea, prevention and immunization.

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List of Abbreviation

-	Minus
%	Percent
±	Plus or Minus
≤	Less or equal to
/	Per
+	Plus
<	.....	Greater than
=	.....	Equals
>	.....	Less than
°C	.....	Degree Centigrade (celcius)
AAP	.....	American Academy of Pediatrics
Abb	.....	full term
ABG	.....	Arterial Blood Gases
C. difficile	.....	Clostridium Difficile
CDC	.....	Centers for Disease Control and Prevention
DNA	.....	Deoxyribonucleic Acid
ECF	.....	Extracellular Fluid
ELISA	.....	Enzyme Linked Immunosorbent Assay
ESPGHAN	.....	European Society for Pediatric Gastroenterology, Hepatology and Nutrition
ETEC	.....	enterotoxigenic Escherichia coli
g	.....	Gram
G. lamblia	.....	Cardia LAMBLIA
g/cm³	.....	Gram per cubic millimeter
GAVI	.....	Global Alliance on Vaccines and Immunization

List of Abbreviation (Cont.)

GE	Gastroenteritis
HIV	Human Immunodeficiency Virus
HUS	Hemolytic Uremic Syndrome
IA	Immunoassay
IEM	Immune Electron Microscopy
IgA	Immunoglobulin A
K⁺	Potassium
kg	Kilogram
ml	Milliliter
mmol/L	Millimole per liter
mosm/L	Milliosmole per liter
mRNA	Messenger Ribonucleic Acid
Na⁺	Sodium
NLVs	Norwalk-Like Viruses
nm	Nanometer
NSP	Nonstructural Protein
ORSs	Oral Rehydration Solutions
ORT	Oral Rehydration Therapy
p value	Probability Value
PCR	Polymerase Chain Reaction
pH	Negative logarithm of the hydrogen ion concentration
ppm	Part per million
RIA	Radioimmunoassay
RNA	Ribonucleic Acid
RT-PCR	Reverse Transcriptase-Polymerase Chain Reaction

List of Abbreviation (Cont.)

sIgA	Secretory immunoglobulin A
SLVs	Sapporo-Like Viruses
SPSS	Statistical Package for the Social Science
USA	United States of America
VP	Viral Protein
WHO	World Health Organization
X²	Chi Square Test
Y. enterocolitica ..	Yersenia. Enterocolitica

Introduction

Acute infectious non-bacterial gastroenteritis is one of the most common infectious diseases of humans, ranking second to acute respiratory tract infections as a worldwide cause of death in children (*Jones et al., 2008*). The most common diarrheal pathogen identified is rotavirus; which nearly infects every child around the globe by the age of 5 years (*Parashar et al., 2009*).

Rotavirus is the most common cause of severe gastroenteritis in infants and young children worldwide. Rotavirus causes approximately half a million deaths each year among children aged <5 years, with >80% of deaths occurring in developing countries (*Parashar et al., 2009*).

The rates of infection are similar in developed and developing countries but the severity of rotavirus infections differs between those two settings. Improvements in clean drinking water supplies and good hygiene are unlikely to prevent the infection since they have little effect on the transmission of infection (*Dennehy, 2008*). Although the mortality rates are low in developed countries, rotavirus infections account for more than 500,000 deaths annually in young children primarily in developing countries (*Bishop, 1996; Feng et al., 2002*).

Introduction

Recently two live oral rotavirus vaccines (Rota Teq and Rotarix) have been recommended by the WHO for inclusion into the national immunization programs of countries worldwide in 2009 (*Patel et al., 2009*).

Aim of the Work

The aim of present study is to determine the prevalence and factor associated with rotavirus diarrhea among Children aged under five year attending outpatient clinic in Ain Shams University Childrens' Hospital.

Chapter (I): Diarrhea

Diarrhea is a universal human experience. The term diarrhea is derived from the Greek words "dia" (through) and "rhein" (to flow) (*Schiller and Sellin, 2006*).

Diarrhea means an increased frequency or decreased consistency of bowel movements. In many developed countries, the average number of bowel movements is three per day. However, researchers have found that diarrhea best correlates with an increase in stool weight; stool weights above 10 oz (300 gs) per day generally indicates diarrhea. This is mainly due to excess water, which normally makes up 60-85% of fecal matter. In this way, true diarrhea is distinguished from diseases that cause only an increase in the number of bowel movements (hyper defecation) or incontinence (involuntary loss of bowel contents) (*WHO, 2012*).

Diarrhea is also classified by physicians into acute, which lasts one or two weeks, and chronic, which continues for longer than 2 or 3 weeks. Viral and bacterial infections are the most common causes of acute diarrhea (*WHO, 2012*).

Several different groups of viruses have been responsible for approximately 70% of the episodes of acute infectious diarrhea in children (*Dennehy, 2011*).

The leading human pathogens include rotaviruses, caliciviruses, enteric adenoviruses and astroviruses. Other viral

pathogens but of minor role in causing severe infantile diarrhea, include human coronaviruses and toroviruses within the virus family Coronaviridae, pestiviruses, bredavirus, parvoviruses, picornaviruses and picobirnaviruses (*Park et al., 2011*).

Global Diarrheal Disease Burden

The WHO considers childhood diarrhea to be the number one public health problem in the world today. Acute diarrhea is one of the leading causes of pediatric morbidity and mortality worldwide (*Grimwood et al., 2009*).

Acute infectious non-bacterial gastroenteritis is one of the most common infectious diseases of humans, ranking second to acute respiratory tract infections as a worldwide cause of death in children (*Jones et al., 2008*). The most common diarrheal pathogen identified is rotavirus; which nearly infects every child around the globe by the age of 5 years (*Parashar et al., 2009*).

Of these diarrhea related deaths, acute watery diarrhea is responsible for 35%; dysentery, for 20%; and persistent or chronic diarrhea, for 45% (*Petri et al., 2008*).

The annual global burden of diarrhea is enormous, involving 3 to 5 billion cases and nearly 2 million deaths, with the latter accounting for almost 20% of all deaths in children younger than 5 years (*Boschi et al., 2008*).