

# Clinical Course Of Diarrhea In Pediatric Primary Health Care

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## Abstract

The main purpose of this study was to observe the evolution of diarrheic disease, detect the incidence of chronic diarrhea, and identify some of the factors related to the protection against or worsening of the disease.

For this purpose the methodology of the uncontrolled study of a cohort was employed.

All cases of diarrhea which came to the out patient clinic for primary care in a low-income area, on the outskirts of Porto Alegre during the period of one year (from January, 2000 to January, 2001) were followed for two months.

The data collection instrument was made up of six protocols including data which would help grasp the natural history of the disease and some factors which may be related such as: age, birth, weight, breast-feeding, degree of nutrition, family income, level of education of the persons responsible for the child, and length of stay with the mother.

It was concluded that the population studied presented a high rate of chronicity (43%) and there was no association with the above prognostic factors

## INTRODUCTION

The decision to study diarrhea in childhood is due to the magnitude of this problem in Third World countries such as Brazil. The discovery and use of the rehydration solution, during the last decade, has reduced morbidity and mortality in most cases. Despite this, diarrheic disease is still the major cause of death in childhood. In 24 studies performed in Africa, Asia and Latin America, excluding China, the population of children under the age of five, a total of 338 millions, had a mean morbidity rate between 2.2 and 3 episodes of diarrhea/child/year. A mortality/case rate equal to 0.6 deaths/100 episodes was observed in children below the age of 5 (<sub>1, 2</sub>). In the Brazilian Northeast, diarrhea accounts for 22% to the total number of deaths and 53% to the total number of deaths, in the under 5 age group(<sub>3, 4</sub>).

This work proposes to study some epidemiological aspects of pediatric diarrhea in a low-income area a large city including demographic, socioeconomic and clinical factors. In the latter, an attempt was made to observe the evolution of the disease, chronification rate, and some likely prognostic factors.

## METHODS

The study was performed in a low-income area of the city of Porto Alegre, Rio Grande do Sul, with approximately 6000

inhabitants. The sample included all children (see inclusion criteria below) who came to the local Sanitary Unit, between January 19, and January 20.

The inclusion criteria were all children living in this area up to 5 years old with diarrhea (increased proportion of liquid contents in stools) who came to the Sanitary Unit for treatment of diarrhea during the period of study. Children who were new-born infants with liquid stools when exclusively breast-fed or whose mother did not understand what diarrhea is were excluded.

When the study began, 6 case follow-up protocols were applied. The first was applied at the first interview with person responsible for the child. This was done at any time during diarrheic disease, i.e.; it might be on the first day or during the extended period. Prevalent cases (defined as chronic if there was a diarrheic condition which lasts more than fifteen days or when three episodes of diarrhea occur in less than two months) were excluded from the analysis of results.

The protocol consisted of identification data (personal information) on the child, diarrhea (characteristics of the stools, duration, associated symptoms, medication used, triggering factors), weight at birth, nutrition, previous medical history of the child, socioeconomic data on the

family, schooling of the person responsible, and how long the child stayed with the mother. Next, the physical examination was performed. After the diagnosis had been established, the management was defined, as uniformly as possible for the whole study.

Subsequent protocols were applied on the 7th, 14th, 26th, 43rd and 60th day of illness, which provided time for the follow-up and evaluation of the natural history, allowing a diagnosis of cure or chronification. All the children were weighed at the six visits and height was checked in the first and 6th protocols.

The staff of the Sanitary Unit team and the interviewers who filled out the protocols was previously trained.

Anthropometric measurements were the object of special care, as well as a calibration with standard weights. The classifications of Gomez, Seone-Lathan and the NCHS were used to analyse the data. A pilot study was begun in two distinct geographical areas, which provided an opportunity to rephrase several questions. In most cases the follow-up interview (second to sixth protocol) were applied during home visits. Data computation and analysis were performed using the SSPS (Statistical Package for Social Science), the chi-square test and the Fisher exact test. The level of significance was established at  $p$  smaller than 0.05.

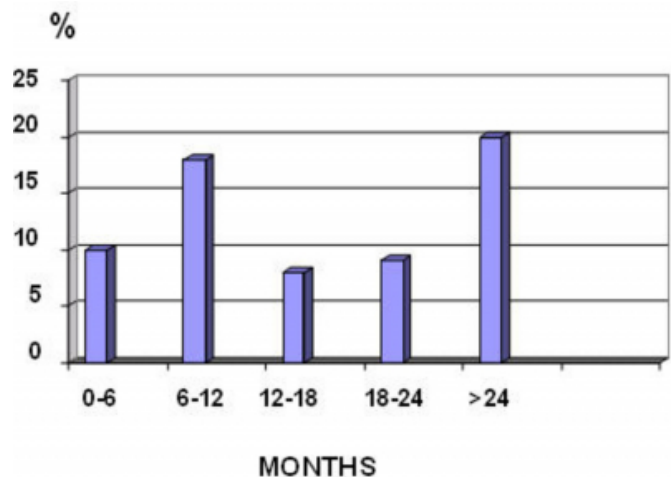
## RESULTS

In the first stage of the study, the profile of a child aged between 0 and 5 years, living in Vila Primeiro de Maio, and the subject of this study, was described.

The distribution of the children in age groups shows a concentration of the problem up to 18 months of age, with a cumulative percentage of 54,8% (Graph 1). As to sex, the sample consists of 41 boys (56,2%) and 32 girls (43,8%).

**Figure 1**

Graph 1: Age Distribution



The family's social and economic position was defined by categorization to a specific social class, using data about the head of the family (person with the highest income), type of occupation, branch of activities, position within the means of production, monthly income, type of establishment, number of employees, and level of education. This was concentrated mainly between proletariat (46,4%) and sub-proletariat (47,9%).

Investigating the family income of this population, it was found that 63% received up to 3 Brazilian minimum wages (approximately US\$ 120.00 a month) and up to six minimum wages (US\$ 360.00) covered 88% of the families.

It was found that most of the mothers stay at home with their children (57,5%). Of those who work, the majority spends eight hours or more away from home (38,3%).

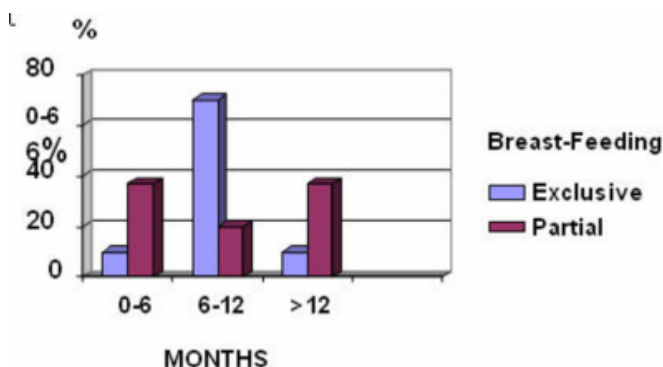
12 children (16,4%) (12 cases) were found to have had low birth weight (less than 2,500g). 64 (87,7%) were breast fed and seven (9,6%) stated that they had not done so.

When analyzing the length of breast-feeding it was found that most of them started breast-feeding, but only 50% were still breast-feeding up to the age of three months.

25% of the children were still being breast-fed during the episode, but there was no difference between exclusive or partial breast-feeding at the time of the diarrhea (Graph 2).

**Figure 2**

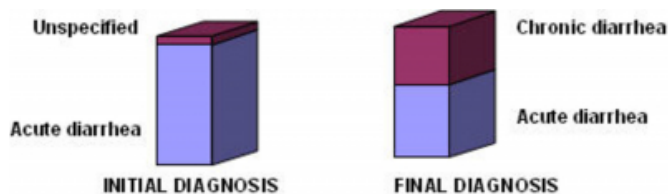
Graph 2: Distribution of the Children Breast-feeding



Of the 58 (82,9%) cases diagnosed as acute at the first interview, and the four cases which were not definitely diagnosed in the beginning (5,7%), 27 (38,6%) became chronic during the course of the study. Initially there were 8 chronic cases (11,4%). When calculating the chronification rate, these eight were excluded and considered prevalent. In this sample the chronification rate was extremely high, 43% (Graph 3). At the end of the study, excluding the three cases lost, the numbers of acute and chronic disease were equal to 35 children (50%).

**Figure 3**

Graph 3: Distribution of the Children Incident Cases



The children's degree of nutrition was initially evaluated according to the classification of Gomez: 38,3% of the children were found to be undernourished, most only slightly (31,5%), and a few moderately (6,8%); there was no case of severe malnutrition.

According to the WHO (NCHS) percentages, the incidence of chronically undernourished was found to be 27,4%, of recent cases 21%. In the classification of Seone and Lathan, a frequency of 32,2% undernourished was observed: 14,5% of these were currently acute undernourished, 4,8% were chronic undernourished, and 12,9% were past chronic undernourished. Using these indicators and classifications, statistical significance with the evolution of the diarrhea, was not observed.

No relevant differences were found with the Fisher test and/or chi square, when observing the variables of age, birth

weight, level of education of person responsible, family income, time so stay with mother, as related to the evolution of the disease.

In spite of the high incidence of low birth weight in the sample (16,4%) the absolute figures are too small to allow an assessment of the prognosis.

The breast-feeding variable was studied from several standpoints: as to the presence, duration, effective time of breast-feeding (>than the third month), exclusive breast-feeding, and partial breast-feeding during the episode of diarrhea. All these possibilities were cross-matched with the type of diarrhea (acute or chronic) and no statistically difference was found.

In observing Table 1, it is confirmed that over half of the sample (51,4%) is not satisfactorily breast-fed at least up to the sixth month of breast-feeding. In the period from 6 to 12 months, coinciding with the main time of weaning and introduction of other foods, human milk appears to have a tendency to protect against chronic diarrhea (31,4% to 8,6%). For the months following the first year of life, figures are similar, and milk also becomes progressively less important as a factor of protection with age.

## DISCUSSION

Many studies (5, 6, 7, 8, 9, 10) have epidemiologically defined an etiological models of acute diarrhea in tropical countries, but very little is known about chronic or recurring diarrhea, which has a potentially greater impact on the nutritional status than acute diarrhea.

In this sample, 43% of the children with acute diarrhea developed into chronic cases. Besides the high incidence at the end of the study, when comparing the acute and chronic disease, equal numbers were recorded – 35 acute cases and 35 chronic (including the prevalent ones).

The definition of chronic diarrhea may vary from author to author based on their clinical experience but, usually (11, 12, 13, 14, 15, 16, 17, 18) it is agreed that any who suffers from diarrhea for more than two weeks has chronic diarrhea. Pathogenesis tends to be due to multiple factors.

In a study of children below the age of 2, in Indonesia, (6) it was proved that most (84%) of the episodes of diarrhea are solved in one week, 10 and 3% of all cases extend from 10 to 24 days, respectively. A similar proportion of cases last over two weeks (3, 4%). In a study in Bangladesh, 23% of all diarrheas lasted over two weeks. In a study in Singapore,

20% of the undernourished below the 10th percentile became chronic (18). In a study made in Madras, India (17) chronic diarrhea comprised 20% of the total hospital admissions related to diarrheic disorders: 35,3% of these children developed recurrence of the diarrhea after the diet was re-introduced. This perpetuates the vicious circle of infection, malnutrition and prolonged morbidity. To again weight during the convalescence period 120-160Kcal/Kg are needed. In this Indian study the seriously undernourished took two to three months to take up growth again, and sometimes four to six months to attain an adequate weight for age.

There is increased susceptibility to infections in the presence of malnutrition, associated with a relatively deficient immune mechanism, which may help cause serious consequences in chronic diarrhea in these children.

No correlation was found to relate the degree of nutrition to the evolution of the diarrheic disease. It might be said that as a tendency for the present acute malnutrition to prevail more in acute diarrhea (20,6%) than in the chronic one (3,8%), but the figures found were very low and no definite statement is possible.

It is believed that the diarrheas cause degradation in the nutritional state and that successive episodes may compromise physical development in infants, leading to malnutrition (19). However, the risk that undernourished children are more likely to develop diarrhea is as yet inconclusive. In these children, however, an episode of diarrhea is more serious due to its longer duration.

The second variable relating to the evolution of the disease was low birth weight. No association was found. In the "Interamerican Investigation of Infant Mortality" (8), it was noted that among 1.260 neonatal deaths due to diarrhea, in eight countries, low birth weight was an associated cause in 49%, and this proportion ranges from 28% in Bolivia to 80% in Jamaica. In the study performed in Pelotas, Brazil (20) the relative risk of death associated low birth weight was 2,5% for diarrhea. Few studies describe the association of low birth weight with diarrhea. Possibly, due to the immune response in these newborn, factors exist which may be related to higher susceptibility to infections.

Diarrhea affects mainly children in their first year of life, but especially at weaning age. During this period a higher mortality rate is observed, and the nutritional consequences are more serious (21, 22, 23, 5). Gamble (24) describes the

mortality rate during the first two years of life as "the disadvantage of being small". In the sample, 54,8% of the children were concentrated in the up to 18-month age group.

Comparing the data from the sample it is found that most are concentrated in sub proletarian and proletarian socioeconomic situations, with earnings of up to two minimum wages.

In this study, the variable "time of stay with the mother" was used, since it is believed to be a possible prognostic factor in the evolution of diarrheic disease. We live in a society in which the job of caring for and educating the child during the first years of life pertains mainly to the mother. When this information was obtained, it was found that 57,5% of the mothers remained at home with their children. Surprisingly, this variable did not lead to any differences in the evolution of the disease, with a tendency to become chronic in the children whose mothers did not have an outside job.

As to the nutritional pattern of the sample, it was found that 50% of the mothers had breast-fed until the third month, coinciding with nation-wide studies performed in Brazil (25, 7, 26). However, almost 25% of these children had only been breast-fed until the end of the first month. Only 15% of the children were within the ideal period, which is considered to be until the sixth month. The fact of breast-feeding does not in itself contribute to chronification.

It might even be considered that the evidence of breast-feeding is persuasive as regards protection against acute diarrheic disease and child mortality (27, 28 29,30, 31, 32), although many questions remain unanswered. Some doubts about the protection afforded by breast milk (33). Does it continue after breast-feeding ceases? How long does this "residual protection" last? How much can be attributed to the better nutritional status of breast-fed children in protection against gastrointestinal infections? How much of this effect is direct (attribute to the components of breast milk), and how much is indirect (attribute to the lack of contact with pathogens)?

A series of factors and their interrelationships (34,35), for instance exposure to infections, socioeconomic conditions, environmental contamination, sanitation, birth weight, mother's nutrition and pre-natal history should be studied and taken into account when considering the practice of breast-feeding and its importance in growth.

In this study, no association occurred between the presence

of breast-feeding and the evolution of diarrhea. It is acceptable that the effect of diarrhea on the growth of a child fed exclusively at the breast is different from that of one who has already been weaned or is in the process of weaning. However, it is known that even children who are exclusively breast-fed may contract diarrhea caused by bacteria and rotavirus. Therefore, this isolated variable must undergo better evaluation as to its influence in disease chronification.

What is the true impact of diarrhea on the child? And how is it to be solved? The answer to this question very much depends on the development and use of interventionist techniques, which deal at least with the triad malnutrition-infection-immunity.

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