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The output and outcome of two types of formal health structures -health post and creche- for nutritional interventions for preschool children in two urban, low-income communities of Belo Horizonte, Brazil (1986)

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SUMMARY. In order to observe the nutritional and health status of pre-school children, the output and outcome of two formal health services -health post and creche- for this vulnerable group in two urban slum areas of Belo Horizonte, Brazil were studied in 1986. A total of 420 children were surveyed, 254 children randomly selected from the communities and 156 from three creches. Growth monitoring was not undertaken systematically, and mothers did not have growth control charts. When a child had diarrhea, mothers prefered to apply home remedies or to buy proprietary drugs rather than to consult medical personnel. 72% of mothers reported using ORT, and 11% suspending feeding completely. After three month of life, 50% of infants were receiving some breast milk. 75% of children were immunized completely. The prevalence of health and nutrition indicators such as anemia (50% vs. 30%), parasitosis (87% vs.70%), and stunting (28% vs. 20%) was worse in the creches than in the communities.

RESUMEN. Resultados y rendimiento de dos tipos de estructuras formales de salud, puestos de salud y guarderías que intervienen en la nutrición de niños en edad preescolar en dos comunidades urbanas de bajos ingresos de Belo Horizonte, Brazil (1986). Con el fin de observar las condiciones sanitarias y alimenticias de niños en edad preescolar, se llevó a cabo en 1986 un estudio de los resultados y del rendimiento de dos estructuras formales de salud -puestos de salud y guarderías- dedicadas a este vulnerable grupo social en dos barrios pobres urbanos de Belo Horizonte, Brazil. De un total de 420 niños en observación, 254 fueron seleccionados al azar en las dos comunidades y 156 en tres guarderias. No se realizó ninguna comprobación sistemática del crecimiento de los niños, ni la madres disponian de tablas de control del crecimiento. Cuando los niños tenían diarrea, las madres preferían aplicar remedios caseros o comprar medicamentos a consultar personal médico. El 72% de las madres afirmó que aplicaba una terapia de rehidratación oral y el 11% que suspendía totalmente la alimentación. Después del tercer mes de vida, el 50% de los niños recibía algo de leche materna. El 75% de todos los niños en observación estaba completamente inmunizado. La prevalencia de indicadores de salud y nutrición tales como anemia (50% vs 30%), parasitosis (87% vs 70%), y atrofia ("stunting") (28% vs 20%) fué más grave en las guarderías que en las comunidades.

INTRODUCTION

It was observed by Mata (1) that apart from particular famine situations due to climatic disturbances or wars, in most developing countries an inadequate nutritional status of the population is due less to a reduced food intake, than to the lack of health infrastructures, such as water supply, sanitation facilities and health services. We feel that this statement might be too general in its present form to be applied to all cases.

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Seasonal influence (2, 3) and inadequate food distribution (4) are common in numerous African countries and cannot be resolved by improving the health infrastructures alone. Nevertheless the above-mentioned statement applies to most regions of Latin America, and is specially valid for the urban metropolises (5). Although a great deal is committed financially to strengthen health infrastructure in developing countries, little is known about effectiveness as meassured in terms of the outcome of health and nutritional status. The objective of this work is to study the output and outcome of two formal health facilities for pre-school children (being the most vulnerable group healthwise). These facilities were the health post and creches (day care centers) in two urban slum areas of a Brazilian city. We assessed how far their standards meet the general recommendations for primary health care of WHO (6) and of the GOBI model described by UNICEF (7).

MATERIAL AND METHODS

Survey design

The state Secretary of Employment and Social Action (SETAS) and the Deutsche Gesellschaft für Technische Zusammenarbeit -gtz- are carrying out an urbanization project, improving basic infrastructure. In the two conglomerations of Alto de Serra and the combined favelas (shanty towns) Barragem de Santa Lúcia and Vila Rita de Cássia of the urban area of Belo Horizonte. This is the capital of the federal state Minas Gerais, and with 2.4 million inhabitants (1986) it is the third biggest city of Brazil. Both communities are located in the southern center, 4 km apart, and subdivided into several favelas (Shanty towns). Three health posts of the Municipal Secretary of Health and three creches are situated in Serra. Two health posts and three creches are located in Sta. Lúcia/Vila Rita.

The study design is shown in Table 1. The output of the work of the health posts was estimated from the degree of knowledge and utilization of the UNICEF/WHO recommended intervention package within the population: growth control, oral rehydration, breast feeding and immunization (GOBI). In the case of diarrhea treatment, the application of oral rehydratation therapy (ORT) was evaluated and also in a wider context, how mothers behaved when children suffered diarrheal diseases. Supplemental feeding programs were not run under the responsibility of the health post and

TABLE 1

EVALUATION MATRIX OF THE TWO FORMAL HEALTH STRUCTURES-HEALTH POST AND CRECHES-STUDIED IN TWO URBAN, LOW INCOME COMMUNITIES OF BELO HORIZONTE, BRAZIL

	Narrative description	Indicators
Health posts:		
Output	Growth control	% of households with
		% of up-dated growth charts
	Diarrheal control	Habits of diarrheal control
	Breast-feeding	% children breastfeeded
	Immunization	Prevalence of immunizaton
Outcome	Health status	Prevalence of dd
		Prevalence of parasitosis
		Prevalence of anemia
	Nutritional status	Prevalence of stunting
		Prevalence of wasting
Creches:		
Outcome	Health status	Prevalence of dd
		Prevalence of parasitosis
		Prevalence of anemia
	Nutritional status	Prevalence of stunting
		Prevalence of wasting

dd: diarrheal diseases.

were therefore not included. Furthermore, it was only during the time of the study, that the Ministry of Health decided to include information about contraceptive methodology in the intervention program of the health services. No decision was made about the provision of contraceptives.

The outcome of the work of the health posts was assessed from the status of health and nutrition randomly selected children from the two communities and in the creches by the status of their children. Anthropometric data and prevalence of anemia and parasitosis served as indicators of the influence of the two health services. Additionally, incidence and duration of diarrhea in randomly selected children of the two favelas were estimated.

Population studied

Table 2 shows the sample number of the population surveyed. At the time of the survey approximately 50 thousand inhabitants were living in an area of 108.0 Ha in Serra.

Consisting of the favelas Vila de Nossa Senhora do Conceiçao, Vila de Santana do Cafezal, Nossa Senhora de Fatima and Marçola. In the second conglomeration of Sta. Lucia/Vila Rita an area of 43.7 ha was occupied by 25 thousand inhabitants. 420 children up to six years of age were surveyed during September and October 1986 from 80 households in Serra, 60 households in Sta. Lucia/Vila Rita, and using of three creches in the two communities. Descriptions of the communities, study population, and surveillance mehodology have been published in detail elsewhere(8).

Since only a little information exists about Brazilian mother's methods of controlng diarrheal diseases, a further 50 households from each of the two favelas communities of Rio de Janeiro, Vila Rica and Morro do Urubu, were surveyed for the purpose of comparison.

Indicators

The hemoglobin concentration of the children was determined by the hemoglobin cyanide method. Examination of feces was carried out according to the method of Goulart and Costa Leite (9).The questions on diarrhea were developed on the basis of the suggetions of the WHO Diarrheal Disease Control Programme (10). A detailed description of the collection of anthropometric data, hemoglobin, stoolsamples and of the data processing is given by Bisi Molina et al (8). Additional differences between observed indicators of population groups were calculated by the chi-square test. Missing data accounted for less than 2% of the observations for all variables, with the exception of the analysis of parasites and hemoglobin where 24.0% and 10.8% respectively of the observations were missing.

RESULTS

Growth control

During the survey, the work of the health-posts was reorganized and the use of charts for growth control was introduced into the formal health system at the municipal level of Belo Horizonte. Up to this time the growth of the infants and preschool children had been only sporadically monitored. No mother had a growth chart at home for recording weight and height.

Habits of diarrhea control

The mothers were asked about their attitude towards diarrhea to get an idea of their confidence in the formal health facilities and the use of home remedies.

Intestinal parasites (20.7%) were regarded to be the main cause of diarrheal atacks, followed by hot climate (17.9%), dirty environment (12.9%) and teething (11.4%). Other factors mentioned were unsuitable food, water, cows milk and waste disposal. On the first day of a diarrheal

TABLE 2

CENSUS POPULATION OF RANDOMLY-SELECTED CHILDREN SURVEYED IN THE COMMUNITY AND IN THE CRECHES IN BELO HORIZONTE, BRAZIL

	Serra	Sta. Lucia/Vila Rita	Total
Census population (106)	50	25	75
Randomly-selected children	153	101	254
Creches surveyed	1	2	3
Children in creches	64	50/42	156
Total of children surveyed	227	193	420

TABLE 3

PERCENTAGES OF THE MOTHERS ACCORDING TO THEIR TREATMENT OF PERSISTANT DIARRHEA IN FOUR FAVELAS OF TWO METROPOLISES IN BRAZIL

	Belo Horizonte			Río de Janeiro		
	Serra	Sta. Lucía/ Vila Rita	Total	Morro Urubu	Vila Rica	Total
	(n=80) %	(n=60) %	(n=140) %	(n=50) %	(n=50) %	(n=100) %
Health professionals	51	35	44	86	88	87
Pharmacy	1	-	1	2	2	2
Home treatment	38	53	44	10	10	10
No treatment	5	10	7	2	-	1
Other treatment	3	2	2	-	-	-
No answer	3	-	1	-	-	-

attack, 57 9% of the households used home remedies to cure the disease, 26.4% sought the assistance of the medical personnel in health post or private doctors and 12 9% of the children received no treatment. With persistence of the diarrhea for longer than one day, the proportion of mothers who treated the infection with home remedies declined considerably. At the same time, attendance at health services increased and the number of mothers who left their children without treatment was also reduced (Table 3). The majority of the mothers (72.1%) said that they were using oral rehydration therapy (ORT) to treat the infection and only 4.3% had never heard of it at all.

Asked about the feeding during diarrhea, 41.4% answered that they gave a special diet to their children, 39.3% continued with the normal diet and 11.4% stopped giving food completely. Table 4 shows the food prefered during acute diarrhea, with comparable data from Rio de Janeiro. Black beans (21.4%), salty meals (17.9%) and cow's milk (12.1%) were regarded as the most important foods to be avoided during diarrhea. Other foods mentioned fequently were papayas, fatty foods, rice and vegetables. 42.2% of the mothers did not specify any food to be avoided during diarrheal disease. The home remedies prepared were mostly teas made form different local trees and plants. 63.6% of the mothers gave some type of home remedy during diarrhea.

A significant relationship between the origin of the mothers and their attendance at the health posts was observed. The mothers who originated from outside Belo Horizonte attended the health posts more frequently and used significantly less home remedies than those originating from the city itself ($Chi^2 = 32.7$; $p = 0.003$). The same trend could be seen according to the origin of the fathers. The higher the educational level of the mothers, the less they visited the health posts. The use of home remedies was equal at all education levels, with the exception of the illiterates ($Chi^2 = 30.9$; $p = 0.009$). Attendance at the health posts also depended significantly on the family income ($Chi^2 = 56.0$; $p = 0.00003$). The higher the income the more often the health posts were attended and the less home remedies were used.

Breast-feeding pattern

Figure 1 shows the breastfeeding and dietary supplementation situation in the two communities of Belo Horizonte. About 10% of the children in Serra and 16% in Sta. Lucia/Vila Rita received a dietary supplementation directly after birth. After as soon as three months only every second child was breast-fed, and only about 20% received exclusive breast-feeding. There was no statistically signficant difference in the breast-feeding pattern between communities.

Stage of immunization

According to Table 4, about three-quarters of the children in both communities had received a complete immunization course. In Serra slightly more children were completely immunized, or without any immunization, whereas in Sta.Lucia/Vila Rita there were more cases with incomplete immunization. However, these differences were not statistically significant. Children with parents coming from

TABLE 4

PERCENTAGES OF FOODS REPORTED BY MOTHERS AS BEING USED FOR FEEDING DURING DIARRHEA (MORE THAN ONE ANSWER WAS POSSIBLE)

Fluid	BH	RJ	Semi-solid	BH	RJ	Solid	BH	RJ
Thea	70	47	Vegetable soup	11	24	Rice	6	40
Fruit juice	13	4	Banana	9	42	Biscuts	6	4
Lemonade	12	1	Potato, boiled	5	27	Noodles	2	20
Milk	41		Gelatine	4	1			
Rice water	3	15	Apple	3	6			
Water of			Starch pudding	3	6			
boiled			Carrot, boiled	-	14			
black beans	1	7						

BH= Belo Horizonte

RJ= Río de Janeiro

TABLE 5

STAGE OF IMMUNIZATION IN THE TWO COMMUNITIES STUDIED

	Serra		Sta. Lucia/Vila Rita	
	(n)	(%)	(n)	(%)
All immunizations	116	77	73	72
Only BCG	1	1	2	2
Incomplete	27	17	24	24
Without	8	5	1	1
Not known	0	0	1	1
Total	152	100	101	100

outside Belo Horizonte, with higher school education or with higher income, had a greater likelihood of complete immunization ($P<0.05$).

Outcome

Health status

About one third of the surveyed children in Serra suffered from anemia (Hb<11 g/dL), and in Sta. Lucia/Vila Rita around one-quarter were anemic (Table 6). In Serra 14% were classified as being severe cases of anemia (Hb < 9.5 g/dL), and in Sta. Lucia/Vila Rita there were 5 cases. In comparison with the randomly selected children of the two respective communities, the children in the creches showed a much higher prevalence of anemia. In one creche two-thirds of the children were anemic and one-half of these anemics showed severe signs of anemia.

A similar picture is shown in the case of the point prevalence of parasitosis (Table 7). The feces of about 70% of the children in both communities were infected with parasites, whereas 80-90% of the children in the creches were infected.

The incidence and duration of diarrhea, another health indicator, differed slightly between the two communities (Table 8). Both indicators were higher in Serra (6.6 episodes/child/year and 5.4 days) than in Sta. Lucia/Vila Rita (5.4 episodes/child/year and 4.8 days). No reliable data were available from the three creches.

TABLE 6
THE PREVALENCE (%) OF ANEMIA IN THE TWO COMMUNITIES COMPARED WITH THAT IN CHILDREN FROM THREE CRECHES

	Serra		Sta. Lúcia/Vila Rita		
	Randomly selected children	Creche A	Randomly selected children	Creche B	Creche C
Anaemia (Hb < 11 g/dL)	34	52	23	36	64
Severe anaemia (Hb < 9.5 g/dL)	14	16	5	8	38
Total number of children studied	142	64	82	49	42

TABLE 7
PREVALENCE OF PARASITOSIS IN CHILDREN OF THE TWO URBAN COMMUNITIES, COMPARED WITH THOSE IN THREE CRECHES

	Serra		Sta.Lúcia/Vila Rita		
	Randomly-selected children	Creche A	Randomly selected children	Creche B	Creche C
Parasitosis (%)	69	84	73	90	90
Total children studied (n)	108	62	60	49	40

TABLE 8
ESTIMATED INCIDENCE (EPISODES/CHILD/YEAR) AND DURATION (DAYS) OF DIARRHEAL DISEASES IN CHILDREN OF BOTH COMMUNITIES

	Incidence	Duration
Serra	6,6	5,4
Sta. Lúcia/Vila Rita	5,4	4,8

TABLE 9

POINT PREVALENCE OF MALNUTRITION IN CHILDREN (%) EXPRESSED BY ANTHROPOMETRIC DATA (2-SCORE OF HEIGHT-FOR-AGE AND WEIGHT-FOR-HEIGHT) OF THE TWO SURVEYED URBAN COMMUNITIES, COMPARED WITH THOSE IN THREE CRECHES

	Serra		Sta. Lucía/Vila Rita		
	Randomly-selected children (n=153)	Creche A (n=64)	Randomly-selected children (n=101)	Creche B (n=49)	Creche C (n=42)
HEIGHT - FOR - AGE					
Moderately stunted (< -1)	29	64	26	73	62
Severely stunted (< -2)	22	25	17	31	29
WEIGHT - FOR - HEIGHT					
Moderately wasted (< - 1)	19	12	17	18	12
Severely wasted (< - 2)	5	0	2	4	5

Nutritional status

In Table 9 the anthropometric data, height-for-age (ht/age) and weight-for height (wt/ht), are compared in the two communities and their respective creches as an indicator of nutritional and health status. About 20% of the children of Sta. Lucia/Vila Rita and 25% of the children of Serra were severely stunted; 2% and 5%, respectively, were found to be severely wasted. In all creches studied there were slightly more stunted children than in the community. No severely wasted child was found in the creche of Serra, slightly more severe cases of wasting occurred in the creches of Sta. Lucia/Vila Rita.

DISCUSSION

It is a hazardous undertaking to assess the desirable output of formal health posts in improving nutrional and health status, when there is no supervision by governments health authorities in this respect. Nevertheless, it could be helpful to compare governmental endeavors to improve the health situation of Brazilian children, according to the internationally suggested "GOBI" recomendations.

The rate of immunzation shows a slightly better record than the national average (11,12), but is much lower than the coverage rate found in Sao Paulo (13). However, the observation that those children whose parents came from outside Belo Horizonte had a higher chance of being immunized, leads to the conclusion that it was not the health posts of community that were responsible for the above average rate of immunization.

The causes of diarrhea thought by the mothers in Belo Horizonte to be mainly of environmental origin, differed considerably from the opinions of the mothers in Rio (mainly contaminated or unsuitable food), in Egypt (common cold and teething) (14) or in Ghana (contaminated or unsuitable food) (15).

The mothers in Belo Horizonte preferred to apply home remedies or to buy drugs rather than to consult medical professionals. This may be a strong indication that the health post did not offer much asssistance to the mothers in cases of acute diarrhea. The fact that mothers with a higher educational level and those originating from the city of Belo Horizonte attended the health posts less, confirm the general observations. In Rio de Janerio, double the percentage of mothers relied on the assistance of medical professionals when the diarrhea persisted.

According to Table 4, most mothers in Rio de Janeiro followed international recommendations and continued feeding children during diarrhea, whereas in Belo Horizonte most mothers prefered to reduce energy intake and administered tea.

The number of mothers who knew about ORT was comparable in both metropolises. Yet it has to be remembered, that knowledge of ORT is not necessarily an indcator for the aplication of this therapy.

Two studies have shown that there exists a reversal trend in the breast-feeding behavior of mothers in urban areas of Brazil (16,17). Monteiro et al (16) demonstrated that the increase in breast feeding in Sao Paulo is due to a trickle-down effect from the urban, high income group to the low income group. The breast-feeding data of the two communities studied show the situation in the two earlier mentioned Brazilian metropolises before the increase of

breast-feeding. Although older breast-feeding data from Belo Horizonte were not available, nevertheless it seems that this trickle-down effect has not happened in this city.

The high prevalence of anemia in both communities, which is quite similar to that of Sao Paulo (18) and the even higher prevalence in the three creches, seemed to be mainly due to the low iron supply in the food (8).

The high prevalence of parasites in the community was again exceeded in the creches. It is known that, with a lack of the appropriate use of physical facilities and ignorance by the personnel by standards of hygiene, children are exposed to a higher risk of infection in the day care centers than at home (19).

The incidence of diarrhea was found to be in the same range as that in the northeast region of Brazil (20). This was much higher than that in Sao Paulo (21) where the incidence of diarrhea had decreased notably during the last ten years, probably because of such factors as an increas in the prevalence of breast-feeding and the extension of water supply and sanitation systems.

As regards the nutritional status and the prevalence of anemia, it was quite surpising that the children in the creches studied were more malnourished and more anemic than those in the randomized sample of the childen in the favela population. This observation raises the question of whether the health posts are doing everything in their power to improve the health status of the vulnerable groups. The health post personnel have easy access to the creches and, as the present study shows, children with a high morbidity and mortality risk, can be reached there and appropriate interventions can be started.

It can be concluded that the creches and health posts in the favelas in Belo Horizonte which were studied have not achieved all the objectives that the GOBI programme demands from such institutions. The health and nutritional situation in the creches is specially alarming, and regular supervision of all creches or day care centers must be strongly recommended in order to improve the health status of preschool children cared for there.

Children of both communities showed a better nutritional and health situation than children in the northeast of Brazil, but worse in comparison with data available for favela children in the southeast, such as Sao Paulo and Rio de Janeiro. However, it has to be remembered that this study has been executed only in two commnities, and may not be representative for all favelas of Belo Horizonte. Since the formal health facilities of both communities were in the process of reorganization and expansion during the study, it can be hoped that nutritional and health indicators have now been improved.

The opportunity to break through the *circulo vitioso* that these children from low-income groups are born into, by starting programs for better nutrition, health education and hygiene should not be neglected.

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