

HEALTH SURVEY ON THE ILHA DA CONCEIÇÃO, ESTADO DO RIO

II. Selected Health Characteristics in Children

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As part of the health survey on the Ilha da Conceição, a 25 percent random sample of households was identified and a health questionnaire completed at 236 households. These households contained 536 children, of whom 239 were under age six. Prenatal care had been obtained by 70 percent of the mothers during the pregnancies of the youngest children and 83 percent of these children had been born in hospital.

The use of available health facilities was reported more frequently for the younger children in comparison to the older children. Over 90 percent of the children had been vaccinated against one or more diseases but only 50 to 60 percent of the children had complete vaccination against pertussis, diphtheria and tetanus. Almost two-thirds of the stool specimens from the children revealed evidence of parasites and were most commonly found in children two to three years of age. Low hemoglobin values were found commonly under age three and hemoglobin levels above 12 grams were not commonly found until age six.

Compared with a North American standard for height and weight, proportionately more children on the Ilha da Conceição were found below the 25th and 3rd percentiles.

These findings suggest that an improved health status for the children on the Ilha da Conceição would result from a household health record maintained at the island clinic including current information on vaccination status of all children, and a health education program focused on expectant mothers and the well baby clinic program.

In 1968, a health survey was completed in a defined area of the city of Niterói, Estado do Rio, Brazil. This study was conducted jointly by students and faculty of the Department of Preventive Medicine of the University of Maryland School of Medicine (Baltimore, Maryland, U.S.A.) and the Department of Tropical Medicine, Fa-

culdade de Medicina, Universidade Federal Fluminense (Niterói, Estado do Rio, Brazil). The health survey included administration of a health questionnaire to the occupants of a 25 percent sample of households on the Ilha da Conceição, Niterói. Information was obtained from 236 households with a total of 1,217 occupants.

The design of this health survey and a description of demographic and environmental characteristics of the total population have been reported separately. (7) This paper will report on selected health characteristics of the children, focusing primarily on those under age six.

Various investigators have reported that children from impoverished areas and from low socio-economic groups have lower average weight and are shorter than children from higher socio-economic groups. (1, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14) Skinfold thickness also tends to be greater in children of higher socio-economic groups and malnutrition has been reported to be associated with smaller head circumference. (3, 4.) The health survey on the Ilha da Conceição focused on the nutritional state of the children, in an attempt to relate these observations to environmental conditions of the household. Since it had been reported by Graham and Morales that severe nutritional problems in Peruvian children were related to birth order (2) this study also included an attempt to extend these observations.

METHOD

Interview information was obtained from adult household members, usually the mother, concerning her prenatal and delivery history, as well as the nursing history, feeding patterns, history of inoculations, and history of illnesses of all children under age six. A limited portion of this interview information was also obtained for other children in the household between ages six and fifteen. The height, weight, head circumference, and chest circumference were measured for the younger of children and specimens of blood and stool were obtained.

The children's height was measured without shoes and recorded in centimeters. Weights were obtained by use of three standard bathroom scales, standardized daily and recorded in kilograms. Head and thorax circumferences were measured by non-expanding tape, respectively at the largest circumference from forehead to occiput and from nipple line to the corresponding area of the back. The skindolf thickness measurements were determined and averaged from each of two areas. The first

area was over the triceps posteriorly, half-way down the left arm between the tip of the acromion and the olecranon. The second area was just below the angle of the left scapula. In each area, the skinfold was picked up parallel to the natural cleavage lines of the skin.

Blood samples for hemoglobin determination were obtained by one laboratory technician who used a standardized fingerstick technique. The blood was collected in heparinized capillary tubes. At the time of the household interview, containers were left to obtain stool specimen from the children. The feces were examined for ova and parasites using the sedimentation method, with stool specimens preserved in methiolate-iodine-formaline solution before examination.

RESULTS

Information for the questionnaires was obtained from 236 of the 250 households, a response rate of 94 percent. (7) These households contained 536 children age 15 and under, and of, this total 239 were under the age of six. (Table 1).

With few exceptions, the physical characteristics of households containing children did not differ from those in the total sample. Proportionately more of the households containing children depended for their water supply on a community spigot (22.9 percent vs. 12.7) and proportionately less obtained their water from a well (2.6 percent vs. 11.4 percent). The majority of the houses were of low middle income level and 94 percent of the households had electricity. The island lacked a sewage disposal system but 95 percent of the homes had a septic tank or cesspool of some type. (7)

Information on the infant feeding patterns was obtained for most of these children. One hundred and ninety-three were breast fed for an average of 8.3 months and 29 additional children were not breast fed (Table II). Of the 222 children on whom a history was obtained, thirty-five percent were breast fed for one month or less and 65 percent for less than six months. Yet one-half of the 122 children, about whom this information was available, had solid food first given to them only after the eleventh month or age.

Hospital births and prenatal care were characteristics of the past medical history of just over half of the children (Table III). The proportion of children whose mothers had received prenatal care and who had been born in the hospital was inversely related to the age of the children. Of the children less than five years of age, 70.2 percent of the mothers received prenatal care during the pregnancy, compared to 40.2 percent for the children aged 10 to 15 years. Eighty three percent of the children less than five years of age were born in the hospital, compared to 20.7 percent of the children aged 10 to 15 years. Of the total of 538 children, less than 4 percent had been delivered without an attendant at birth and 42 percent had been attended by a midwife at home.

In the year prior to the health survey, thirteen of the children had been admitted to a hospital at least once and almost 60 percent of the children had been seen at some other health facility, either the health clinic on the Ilha da Conceição or another clinic in the city of Niterói (Table III). Proportionately more of the younger children had used such health facilities than the older children. Over 90 percent of the children had been vaccinated against one or more diseases and the proportion of children who had been vaccinated was lowest in the youngest age group.

The specific vaccines received by these children are listed in Table IV. Slightly

over half the children had been partially vaccinated against smallpox, poliomyelitis (Sabin vaccine), and the combination of diphtheria - pertussis - tetanus. An additional 10 percent had been vaccinated against tetanus only, and 22.5 percent against typhoid. It was difficult to get complete immunization histories because of lack of records in the homes and poor recall of these events by some mothers, especially those with numerous children.

Stool specimens were obtained from 197, or 83 percent, of the children under age six, and parasites were found in 124, or 63 percent of the specimens (Table V). Stool parasites were found in 21 percent of the infants and the prevalence was highest in the children two to three years of age. *Ascaris lumbricoides* and *Trichuris trichiura* were the commonest parasites found (Table VI.) Infestation with *Entamoeba histolytica*, *Ancylostoma duodenale* or *Giardia lamblia* was much less common. There was one instance each of *Balantidium coli* and *Necator americanus*.

Permission to obtain blood specimens for hemoglobin determination was obtained from the parents of 377, or 70 percent, of the 536 children under age sixteen. The mean hemoglobin values of these children, by age groups, are listed in Table VII. Children less than three years old had average hemoglobins of 10 grams and an average hemoglobin over 12.0 grams was not reached until age six.

TABLE I
AGE — SEX DISTRIBUTION OF CHILDREN IN STUDY POPULATION
ILHA DA CONCEIÇÃO

Age	Nº Males	Nº Females	Total
01-11 months	14	16	30
12-23	19	18	37
24-35	18	27	45
36-47	28	28	56
48-59	19	14	33
60-71	24	14	38
0-5 years	122	117	239
6-8	54	42	96
9-11	49	41	90
12-15	61	50	111
TOTALS	286	250	536 *

* Total excludes two adopted children of unknown age.

TABLE III

USE OF MEDICAL CARE RESOURCES BY STUDY POPULATION

Age (Years)	Total Pop'n. No.	Mother Given Prenatal Care		Child Born in Hospital		Child Hospitalized During Prior Year		Child Used Other Health Facilities in Prior Year		Child with any Vaccination	
		Nº	%	Nº	%	Nº	%	Nº	%	Nº	%
0-4	201	141	70.2	167	83.2	7	3.5	143	71.2	173	86.4
5-9	161	90	55.9	87	54.0	2	1.2	84	52.2	152	94.8
10-15	174	70	40.2	36	20.7	4	2.3	84	48.2	174	100.0
Totals*	536	301	56.2	290	54.1	13	2.4	311	58.0	499	93.0

* Two children of unknown age omitted from calculations.

Height and weight was determined for 233 of the 239 children below the age of six, and these physical measurements were plotted on a growth chart standard based on data from a white population⁽¹⁵⁾. In comparison with this standard, a higher proportion of children in the study population were below the 25th and 3rd percentiles in both height and weight (Table VIII), 45 percent of the females and 40 percent of the males were below the 25th percentile in both height and weight, and approximately 15 percent of all children were below the 3rd percentile in both height and weight.

To compare growth characteristics of children with differing birth order, the physical measurements on children of each birth order were plotted on a growth chart and each growth chart then compared with the standard data. The results are shown in Table X. A greater proportion of the higher birth order females was found to be below the 25th and 3rd percentile for height. This association was not found for the height of males or the weight of females. The weight of the male children showed the reverse relationship; a decreasing proportion of higher birth order males found below the 25th and 3rd percentile.

The collected data on head and thorax circumference, as well as skinfold thickness, were consistent with above mentioned finding on height and weight. To conserve space, the tabular material is not included with this report.

DISCUSSION

This report focuses on health characteristics of children in the Ilha da Conceição

and it was found that: not all the mothers of young children had received antepartum care; the nutritional state of the children could be improved; stool parasites were common in young children and their vaccination status was incomplete. The findings reinforced the recommendations previously made⁽⁷⁾ that a health education program would be beneficial for the residents on the Ilha da Conceição.

PRENATAL CARE

The survey obtained historical information of prenatal care provided the mothers of the children in the households. Mothers of the youngest children received proportionately more prenatal care and had the most hospital deliveries, a considerable improvement compared to the antepartum and delivery care pregnancies in an earlier period. No information was obtained in this survey about specific facilities used for prenatal care but such care was not available at the island health clinic. In the absence of such services, the island clinic could enhance this desirable trend towards prenatal care and hospital deliveries by health education activities and functioning as an information and referral source for expectant mothers. Since midwife deliveries at home still do occur on the island, the health officer could assume responsibility for supervision and/or training of these midwives.

NUTRITION

The nutritional state of the children was appraised on the basis of hemoglobin levels and stature. The mean hemoglobin

TABLE II
DURATION OF BREAST FEEDING OF YOUNG CHILDREN, BY HISTORY

Age (mos.)	Number	Percent
00-01	49	22.1
02-06	67	30.2
01-12	32	14.4
13-24	37	16.7
25-36	8	3.6
Not breast fed	29	13.1
Total	222	100.1

TABLE IV

HISTORY OF VACCINE ADMINISTRATION

Innocation	Nº Innoculated	%
Variola Vaccination	310	57.6
Sabin*	315	58.5
Typhoid Innoculation *	121	22.5
BCG	251	46.7
DPT *	288	53.5
Tetanus Only *	55	10.2

* At least one dose vaccine administered

TABLE V

OCCURENCE OF PARASITES IN STOOL SPECIMENS OF YOUNG CHILDREN

Age (mos.)	Nº of Children Providing Stool Specimens	Nº of Specimens with Parasites	% of Stool Specimens with Parasites
01-11	24	5	21
12-23	32	12	37
24-35	39	32	82
36-47	45	31	62
48-59	27	21	78
60-71	30	23	77
Total	197	124	63

TABLE VI

Parasite	Nº of Stools with Parasites	% of Stools with Parasites
Ancylostoma duodenale	7	3.6
Ascaris lumbricoides	95	48.2
Trichuris trichiura	75	38.1
Amoeba histolytica	1	.5
Giardia lamblia	6	3.0
Other	2	1.0
Total Nº of stool specimens with parasites *	124	63

* Multiple infestations were present in 60 cases; mostly a combination of Ascaris and Trichuris infestation.

TABLE VII

MEAN HEMOGLOBIN LEVELS OF STUDY POPULATION CHILDREN

Age in Years	Number of Children	Mean Hemoglobin (Grams %)
0-2	77	10.1
3-5	87	11.5
6-8	23	12.6
9-11	113	12.8
12-15	77	13.1
Total	377	

was lowest in the youngest children and showed progressive increases in each older age group of children. Only those groups of children who were of school age had mean hemoglobin levels above 12. School children are provided with free lunches but the contribution of this lunch program to the rising hemoglobin levels could not be determined from this survey.

The physical measurements of the children indicate that a higher proportion of the Ilha da Conceição residents were of low height and weight in comparison with a North American standard. Because of an earlier report from Peru that children of higher birth order were more likely to have severe nutritional problems, the relationship of birth order to stature was ex-

plored. There was no consistent finding of lower height and weight for the children of higher birth order. The discrepancy between these findings and the report by Graham and Morales (2) might be accounted for by the fact that no severe nutritional problems were noted on the island and also because the island residents, as a group, were not of the lowest social and economic class.

Detailed dietary histories were not attempted but some information was obtained to suggest that the nutrition of residents, particularly the children, needed improvement. The finding that half the children, as infants, were not started on solid food until approximately one year of age suggests the need for an educational pro-

TABLE VIII

HEIGHT AND WEIGHT OF CHILDREN, UNDER AGE SIX, COMPARED TO STANDARD GROWTH CHART*

Ilha da Conceição, 1968

Height					
Sex	No.	Below 25th Percentile		Below 3rd Percentile	
		Nº	%	Nº	%
Female	106	48	45.3	17	16.0
Male	116	46	39.7	27	23.3

Weight					
Sex	Total	Below 25th Percentile		Below 3ard Percentile	
		Nº	%	Nº	%
Female	106	48	45.3	16	15.1
Male	116	47	40.5	13	11.2

* The standard growth chart is based on data from a white population (15).

TABLE IX

RELATIONSHIP OF BIRTH ORDER, HEIGHT, AND WEIGHT COMPARED TO A STANDARD GROWTH CHART

HEIGHT										
MALES						FEMALES				
Birth Order	Total Boys	Below 25th Percentile		Below 3rd Percentile		Total Girls	Below 3rd Percentile		Below 3rd Percentile	
	Number	Nº	%	Nº	%		Number	Nº	%	Nº
1	27	12	44	4	14	35	12	34	3	9
2	30	11	40	8	26	23	10	44	2	9
3	19	9	42	3	16	16	4	25	3	19
4	13	6	46	5	37	12	6	50	2	17
5-10	27	8	29	7	26	20	16	75	7	35

WEIGHT										
MALES						FEMALES				
Birth Order	Total Boys	Below 25th Percentile		Below 3rd Percentile		Total Girls	Below 25th Percentile		Below 3rd Percentile	
	Number	Nº	%	Nº	%		Number	Nº	%	Nº
1	27	15	55	4	15	35	13	37	7	20
2	30	12	40	4	13	23	12	52	3	13
3	19	9	42	2	11	16	8	50	1	6
4	13	4	30	1	7	12	4	33	1	8
5-10	27	7	26	2	7	20	11	55	4	25

gram to improve infant feeding. The late onset of initiating solid food to the infants could well be related to the low hemoglobin levels noted in this age group of children. In children over the age of one, the use of eggs, meat or fish as sources of protein was reported at least once, and usually three or four times a week by over 70 percent of the children.

An educational program in nutrition could well be the responsibility of the island health clinic and could focus on improvement in the well baby clinic program as well as improvement in health education during the prenatal period. It may be that some of the island residents could participate as health aides in such an education program.

The prevalence of stool parasites in young children was impressive and warrants initiation of a surveillance and treatment program in conjunction with improvement of environmental sanitation on the island. The surveillance and treatment program could well be the responsibility of the island clinic.

Vaccination

Most of the children had been partially vaccinated against at least one disease and in children aged ten and older, all had been at least partially vaccinated against one disease. Yet vaccination was less than complete since less than 60 percent of the children had been vaccinated against smallpox or poliomyelitis, and only 64 percent against tetanus, and 54 percent against diphtheria. These infectious diseases were common causes of reported deaths during infancy of other children in these households (7) and it was children of the youngest age group which had the least exposure to any vaccination (Table III).

Vaccination for the children can be obtained at a number of health resources and there is no central source of accurate information on immunization status of the children. Indeed, we were notified before the survey began that practically all the children had been immunized against diphtheria, pertussis and tetanus. The survey results indicate the need for a selective vaccination program to attain a more complete immunization status of the children. Such a program would be facilitated with development of an up-to-date record system at the island clinic on the immunization status of the residents. (7)

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RESUMO

Como parte do inquérito de saúde na Ilha da Conceição, foram identificadas 25% de amostras casuais de domicílios e concluído um questionário de saúde em 236 domicílios, onde residiam 536 crianças, das quais 239 tinham menos de 6 anos de idade. 70% das mães durante o período de gravidez dos filhos menores receberam cuidados pré-natais e 83% dessas crianças nasceram no hospital.

O uso de facilidades sanitárias disponíveis foi relatado mais frequentemente para as crianças menores em comparação com as de maiores grupos etários. Mais de 90% das crianças tinham sido vacinadas contra uma ou

mais doenças; apenas 59 a 60% tinham vacinação completa contra coqueluche, difteria e tétano. Quase 2/3 das amostras de fezes das crianças evidenciaram parasitos, mais freqüentes em crianças de 2 a 3 anos. Valores baixos de hemoglobina foram em geral encontrados em crianças abaixo de 3 anos e níveis de hemoglobina acima de 12g não foram comumente encontrados até 6 anos de idade.

Comparados com um padrão norte-americano para altura e pêso, proporcionalmente a maioria das crianças na Ilha da Conceição foi encontrada abaixo de 25º e 3º "percentils".

Esses achados sugerem que um "status" de saúde melhorado para as crianças na Ilha da Conceição poderia ser conseguido mediante um registro de saúde domiciliar mantido na clínica da ilha, incluindo informações gerais sôbre vacinação de todas as crianças, um programa de educação sanitária especialmente focalizando as gestantes e um bom programa de higiene e clínica infantil.

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