

Prevalence and risk factors in iron deficiency and anemia

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SUMMARY. Prevalence and risk factors in iron deficiency and anemia. Iron deficiency anemia is nowadays the world most prevalent nutritional problem. Several studies concerning anemia prevalence were carried out in Brazil with pregnant women and children aged less than 5 years, restricted mainly to northeast and southeast regions of the country. More recently, groups other than those of pregnant women and children aged less than 5 years, such as school children and adolescents, have become the target of those concerned with the issue. The differences found out among the groups and the diversity of methodologies employed, prevent us from reaching an evolutionary profile concerning nutritional anemia in Brazil. However, the high rates of prevalence verified by the various studies carried out are enough for justifying the general interest in controlling and/or eradicating the disease. This paper presents a model of causal determination of anemia, that points out the diet as the principal immediate factor. The typical Brazilian diet is poor in bioavailable iron. The two foods - meat and beans - responsible for the totality of this mineral in the habitual Brazilian diet have been registering a decreasing intake in the last decades. Iron deficiency is also observed in the food practice of infants and children aged less than 5 years. This situation justifying the urgency in finding an effective intervention to control this relevant nutritional problem.

INTRODUCTION

Iron deficiency anemia is nowadays the world most prevalent nutritional problem. Anemia brings about innumerable consequences to the organism, symptoms of which vary from a diminishment in the productive ability and less resistance to fatigue, common to all anemic individuals, to an increase on the morbid-mortality in the infant-maternal group as well as behavioral disorders among children (1,2).

In 1980, the World Health Organization (1) estimated that

approximately 700 millions of persons in the whole world were anemic, including more than half the children aged less than five years and pregnant women from underdeveloped countries

PREVALENCE AND RISK FACTORS

An exhaustive survey on studies concerning anemia prevalence in Brazil was carried out by Vannucchi, Freitas & Szarfarc (3), covering the period from 1965 to 1990. Among them, Table 1 empha-

TABLE 1
Prevalence of anemia in Brazil, considering
geographic regions and studied groups: 1980-1997

Region/State	Group (Sample Size)	Prevalence Anemia	Source/Year
Northeast			
Paraíba	pregnants (217)	36,9	Salzano et al., 1980
Pernambuco	pregnants (194)	35,5	Romani et al., 1982
Pernambuco	pregnants	35,5	Torres et al., 1984
Pernambuco	0-2 years (1306)	51e77	Salzano et al., 1985
Pernambuco	1-4 years (573)	41,9	Mariath et al., 1985
Bahia	< 5 years	22,4	Assis et al., 1990
Southeast			
São Paulo	< 2 years	35,0	Sigulem et al., 1983
São Paulo	< 3 years	38,9	Guerra et al., 1983
São Paulo	4-5 years (370)	24,5	Tone, 1984
Rio de Janeiro	pregnants	13,7	Batista Filho et al., 1984
São Paulo	pregnants	35,1	Szarfarc, 1985
São Paulo	2-5 years (912)	35,6	Monteiro et al., 1987
São Paulo	< 2 years	40e 45	Torres et al., 1987
São Paulo	6-24 months(307)	26,0	Sichieri, 1988
São Paulo	pregnants	29,0	Sinisterra-Rodriguez, 1991
São Paulo	pregnants	14,2	Fujimori, 1994 (5)
São Paulo	12 months (371)	42,6	Szarfarc et al., 1996 (6)
São Paulo	0-1 year (317)	14,5	Souza et al., 1997 (7)
South			
Paraná	4-6 months (284)	9,3	Uchimura et al., 1989

SOURCE: Adapted from Vannucchi.H.; Freitas.M.L.S. & Szarfarc.S.C. (3)

sizes those carried out from 1980 on, with pregnant women and children aged less than 5 years and showing that they are restricted to solely two Brazilian regions: Northeast and Southeast.

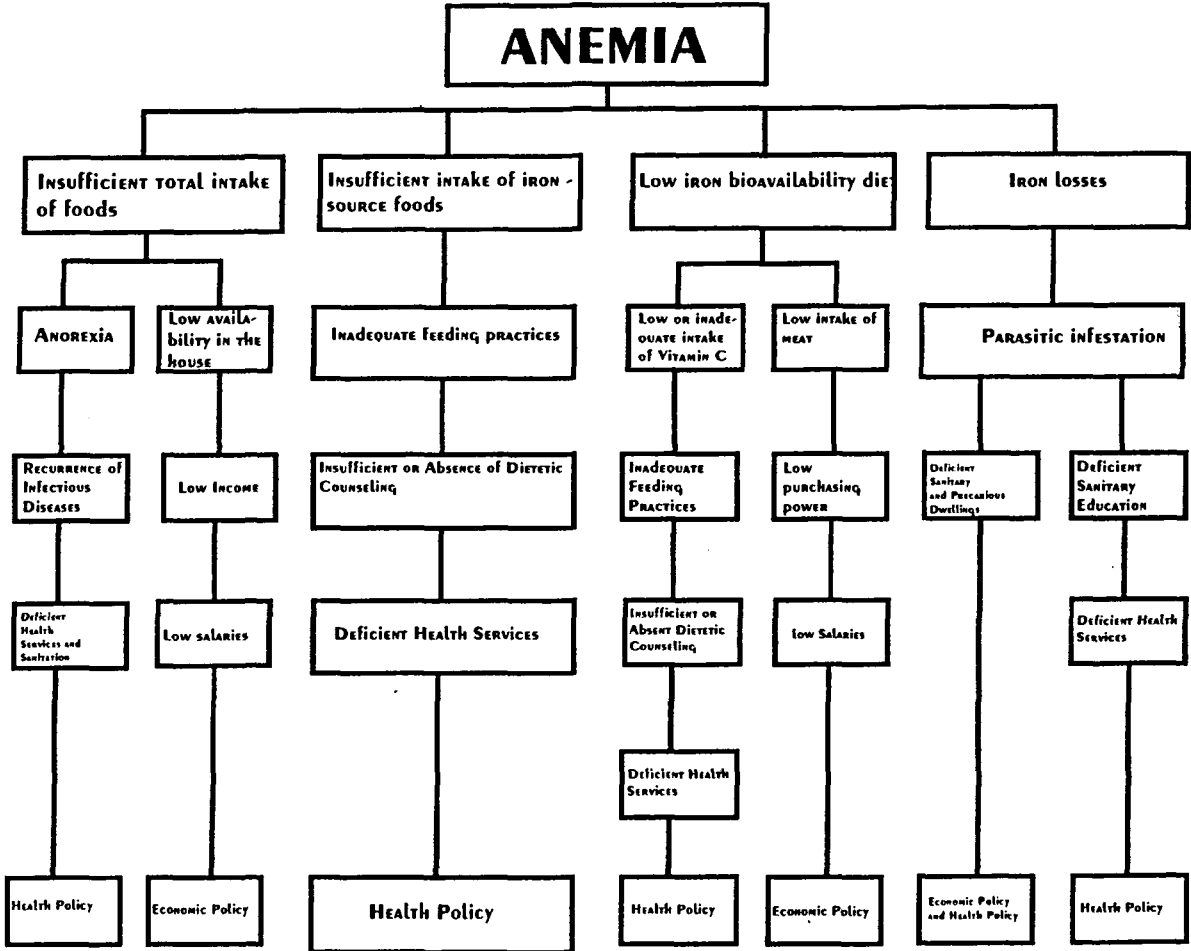
More recently, groups other than those of pregnant women and children aged less than 5 years have becoming the target of those concerned with the issue. Some studies carried out with school children and adolescents in Brazil are worth being mentioned. A survey carried out with 554 school children attending the 5th. and 8th. grades of public schools in the city of Osasco, SP, Brazil, observed 5.3% of anemia prevalence among the entire target population (4). On the other hand, another survey (8) found out 51% of anemics in children of both sexes entering the 1st. school grade, in the same city. In Maringa, PR (9) another survey pointed out 31.7% of anemia prevalence in children entering the 1st. grade of state elementary schools. A survey carried out with 262 female

adolescents in the city of Taboão da Serra, SP (10), reported the finding that 17.6% of them were anemic.

The differences found out among the groups studied covering localities presenting diverse realities and employing different methodologies prevented us from reaching an evolutionary profile concerning nutritional anemia in Brazil. However, the high rates of prevalence disclosed by the various studies carried out are enough for justifying the interest of all in identifying the determinants of this process as well as in controlling and/or eradicating the disease, moreover when it is a well-known fact that iron deficiency is a process of gradual onset in human organisms and that anemia, even in its initial phases when it has not yet manifest itself, can seriously affect health.

Chart 1 shows a model of causal determination contemplating from the immediate factors - inadequate diet and iron losses - to the basic

CHART 1
Model of anemia causal determination



ones, establishing that anemia, as all other nutritional deficiencies, is ultimately the consequence of poor socio-economic conditions. Epidemiological studies (11,12) carried out in the municipality of São Paulo, State of São Paulo, Brazil, vouch for the gradual decrease in the parasitic infestation rates as well as the absence, in those

infested with, of *Ancylostoma* and *Necator*, parasites responsible for blood losses which might lead to anemia. Therefore, diet assumes a prevalent role as a causal factor of iron deficiency. A study aiming at the evaluation of the density of iron bioavailability on the daily Brazilian dietary pattern was carried out (13).

This dietary pattern included three meals: sweetened black coffee with white bread with margarine, for breakfast; rice, bean, meat, tomato and sweetened black coffee for lunch; and rice, bean, eggs and sweetened black coffee for dinner. Meals without meat, as in the case of the dinner on the focused diet, even with a reasonable content of iron provided for by the bean, are potentially very far from being effective in granting the organism the needed amount of this mineral. The presence of eggs (ordinarily used as a substitute for meat) and the absence of citrus fruits or other sources of vitamin C, conferred a very low iron bioavailability upon the meal, similar to that of the breakfast. The presence of a small amount of meat at lunch increased in 3 to 4 times the iron utilization

when compared with that of the other meals. The study pointed out that this kind of diet meets the adult male's iron needs; however, regarding the adult female, it does not supply the recommended iron amount, even when meeting the energetic needs.

Brazilian feeding practices are very poor in absorbable iron. It is worth emphasizing that the two foods (meat and beans) responsible for practically all of iron intake in the customary diet have been registering a decreasing intake in the last decades in the Brazilian metropolitan regions (14), as it is shown on Table 2.

It is worth mentioning that the reduction of intake, common to all the studied localities, is strongly linked to the supply and cost of

TABLE 2
Per capita daily average consumption of meat and beans,
according to place and period

Metropolitan Regions	Period					
	Meat			Beans		
	61-62	74-75	87-88	61-62	74-75	87-88
São Paulo	45	50	28	88	76	57
Rio De Janeiro	63	53	36	167	96	70
Belo Horizonte	37	44	33	94	56	46
Curitiba	55	46	21	122	74	44
Salvador	51	46	28	156	108	74
Fortaleza	90	66	44	148	69	47
Recife	54	45	26	124	75	56

SOURCE: Adapted from Szarfarc, S.C.; Lerner, B.R.; & Stefanini, M.L.R. (14).

food-stuff and not necessarily to a change in the population's dietary habits. Vouching for this statement, an important increase on the chicken intake (which price suffered a marked decrease in the period) was registered, although being not enough to replace for the decreased intake observed in products of bovine origin.

The monotony of this diet, leading to a deficient absorbable iron, is also observed on the food practice of infants and children aged less than 5 years. Szarfarc and colleagues (unpublished), in a research carried out with children aged 0-1 year attending health centers in the municipality of Santo André, SP, Brazil, reported that milk was practically the single food the infants were fed with in their first six months of life. Exclusive breast-feeding takes, in general, no longer than the first three months of life when infants pass to be fed whole cow's milk. The nursing bottle is, in general, prepared with sugar and a thickening stuff (any kind of flour), a habit that turns milk into the most important energetic food source during the children's whole first year of life. The first salt meal is introduced between the 4th and 6th months of age, including an insignificant amount of meat and roots, tubers, vegetables and cereals, all of them poor in iron. The second salt meal, with the same composition as that of the first one, is given between the 7th and 8th months of age. Orange juice, the diet single source of vitamin C, is offered isolated from the salt meals, a practice beginning, in most of the cases, at the 4th month of age.

In the situation mentioned above, the infant feeding practice does not meet the recommendation of iron. Similar feeding practice was observed in the Municipality of São Paulo, SP, Brazil (15,16). Even among children aged 24-60 months feeding practices which meet iron recommendation are infrequent (15). In relation to the first year of life (16), it is emphasized that the feeding practice is eminently lacteous. Since this is a period for introducing new foods, the amounts ingested are small, not only due to the infant's limited gastric capacity, but also to the impact of accepting them. It must also be taken into consideration the restrict variety of foods the children are offered to.

CONCLUSIONS

The observed Brazilian feeding practices, recognized as the main cause of the high prevalence of anemia, as well as the adverse consequences of iron deficiency to the health of the population are enough for justifying the urgency in finding mechanisms of intervention which lead to successful fight against these relevant nutritional problems.

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