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Scientific production in nutrition and the public perception of hunger and eating in Brazil

ABSTRACT

There is a contradiction between the perceptions held by different sectors of the Establishment with regard to the questions of hunger and nutrition in Brazil. On the one hand, the flagship of the present Brazilian government's social policy is the "Fome Zero" program. This program is based on the notion that the condition of hunger is socially relevant in this country. On the other hand, the scientific community in the field of nutrition has, through epidemiological studies, highlighted obesity as one of the most serious public health problems in Brazil. The reason why the public perception is dissociated from the production of knowledge on this subject has old roots that are related to the difficulties in institutionalizing science in Brazil. This has been reflected in a relative lack of legitimacy for scientific discourse. The new factor in this situation is the attainment of greater international visibility by the scientific community in nutritional de epidemiology. The future of the practical application of the results from nutritional epidemiology research in Brazil depends on the dynamics of the political agenda regarding hunger and nutrition, and of the sectors associated with this. The objective of this study was to explore this situation by means of analyzing scientometric data on the scientific production, historical data and documents relating to discourse about hunger.

KEYWORDS: Hunger. Health transition. Obesity. Nutrition programmes. Government programs.

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INTRODUCTION

There is a discrepancy between the perception of different sectors of the Establishment regarding the subject of hunger and nutrition in Brazil. On the one hand, the cornerstone of the present Brazilian government's social policy is the "*Fome Zero*" program. This program is based on the concept that the condition of hunger in the country is socially relevant. On the other hand, the scientific community in the field of nutritional epidemiology has been pointing towards obesity as one of the most serious public health problems in Brazil, even among the poorer strata of the population.

The reason why the perception of the public authorities, as substantiated in the implementation of the *Fome Zero*, is dissociated from the production of knowledge on the subject has old roots. Historically, the Brazilian scientific community fought to conquer its space in society. Over the course of this process, it ended up encapsulated: isolated from the productive sector and public demands.[4,5,18] The lack of legitimacy of scientific discourse on hunger and obesity in Brazil may partially reflect a chronic condition of Brazilian science.

The new factor in this situation is the gaining of wider international visibility by the scientific community in the field of nutritional epidemiology. This has resulted in a credibility shock: the discourse of a scientific community strengthened by indicators of merit and recognition confronting the presuppositions of public policies from a government strongly backed up by institutionalized sectors, such as public bodies and universities, in the fields of both social and human sciences.

This confrontation has serious implications regarding the relevance, space and role of science in Brazilian society, such as if decision-makers within the public sphere have been making their decisions without the support of the corresponding scientific information. If the role of the information produced is to provide backing for decisions on public policies, it is necessary to explain this act of deliberately disregarding information that already exists.

The objective of the present paper was to explore the phenomenon of this confrontation by means of analyzing scientometric data on Brazilian scientific production, historical data and documents regarding the subject of hunger. From this, the implications of this discourse are further discussed from the point of view of the applicability of scientific knowledge for establishing public policies.

Scientific information for decision making

There is an old and diversified discussion among science scholars regarding the destination of products from scientific activity beyond the walls of their own community. Inside this community, knowledge moves around in a relatively self-referenced manner: it is produced according to thinking styles or intellectual priorities that are stipulated by an organized and hierarchical group of specialists. Its rhetoric relates to controversies that orchestrate the power relationships among them, and the assessed product legitimates the producers.[6,10,12]

However, the scientific knowledge interacts with practices that are external to the scientific community. It can be said that scientific production is consumed in different manners by different consumers that will make different social uses of it. The use made by players outside the community varies greatly, as does the origin of this transference of scientific products to external consumers. This phenomenon is related to old questions regarding the utility and applicability of knowledge.

Gibbons et al[8] (1994) called the knowledge produced according to the self-referenced logic detailed above "Mode 1" production, typical of capitalism prior to the Second World War. "Mode 2" would correspond to a way of producing knowledge in which the internal logic of each discipline would have less power for directing study objectives, strategies and methodologies, since the production would be more diversified with regard to the institution, the players involved and the interests in question. The production of this knowledge would imply greater feedback for the players outside the community (social accountability), i.e. the production in an "application context", in which the solution for a given practical problem would dictate the theoretical and methodological strategies. Other authors have affirmed that these two modes have always existed (Fuller,[7] 1995).

In the present paper, these modes have been considered to be different aspects of scientific production, in which the proportional weights of self-referenced emphasis or conditioning factors relating to demands and extra-scientific interests vary according to the case. No knowledge produced is restricted to the community or disregards culture and values to be generated and consumed.

This phenomenon divides the questions regarding the consumption of scientific knowledge between industrial innovation (science push/market pull) and public demand. Both questions place the problem

within the configurations of the investigation program and the conditions of knowledge production itself, influenced by interests other than those internal to the scientific community.[17] There is another category of questions that is related to the previous ones and evident in the case of *Fome Zero*. Before asking how far the Brazilian community of nutritional epidemiologists has been guided by the demands of public interest, it is necessary to ask how much the social players involved in the production of public health policies have made use of scientific knowledge in order to make decisions.

The most general question relates to the extent to which, in a rational and bureaucratic society, the decision-makers within the public sphere and the interest groups with power to condition public policies are obliged to found such decisions on an empirical basis supported by the scientific community.

The question is: why was it possible, in Brazil, to create a public policy against a nonexistent epidemiological phenomenon, hunger?

The answer to this question requires an analysis from the points of view of those who produce and disseminate – the scientific community – and of those who make use of the scientific information to make decisions. From the point of view of those who produce, the literature on the history and sociology of Brazilian science suggests, as explanations, its historical isolation and the still incomplete creation of a social space for science.

An example in the history of Brazilian science of a situation where the information needed for decision-making was available but was not used, relates to the eradication of Chagas' disease. The disease was discovered in 1909, and in 1912 there was already enough information for adopting eradication measures. However, an institutional program was proposed only in 1985, when the Brazilian specialists achieved space within the government. Within a few years, the transmission of this disease was practically eliminated in Brazil and in the whole Southern Cone (Coutinho & Dias,[3] 1999). Seventy-three years were needed for the information made available by the scientific community to be effectively put into use with the practical aim of creating a health policy.

From the point of view of those taking up the scientific information, the various interest groups participating in the creation and adoption of a certain public policy manipulate this information according to their needs, by adulterating it or not considering it at all.

One example of this phenomenon is the non-governmental organizations (NGOs) that are dedicated to programs for attending to children living in the streets. Many of them use figures of the order of several million children living in the streets. Schwartzman* (1994), while president of the *Instituto Brasileiro de Geografia e Estatística* (IBGE - Brazilian Institute of Geography and Statistics), warned about the risk of confounding "poor child" with "homeless child", since the data did not support those numbers.

Thus, even in modern societies, the extent to which technical information assessed by a legitimate group of specialists has to be resorted to for decision-making varies greatly.

Epidemiology of hunger in Brazil

According to Monteiro,[13,14] chronic hunger of epidemiological importance is a chronic energy deficiency, and this is one of the types of malnutrition. This means that the total caloric value of food in the individual's diet is less than the daily caloric consumption, independent of the macro and micronutritional composition.

Conventionally, the presence of hunger is measured by counting the number of adults with a body mass index (BMI) of less than 18.5kg/m^2. The rationale for adopting this indicator is that energy deficiency in adults leads to weight loss. Therefore, by identifying the percentage of adult individuals with low weight in a population, a very precise idea about the extent of hunger in that country or region can be obtained. According to the World Health Organization (WHO), levels of low-weight adults of less than 3% characterize countries where there is no hunger; between 5 and 9%, low prevalence of hunger (thereby suggesting a need for monitoring measures); between 10 and 19%, moderate prevalence of hunger; between 20-29%, high prevalence; and over 40% characterizes very high prevalence of hunger, *sensu strictu* (WHO,[19] 1995).

The studies by Monteiro[14] showed that the hunger problem is of small extent in Brazil. In 1996-1997, the percentage of low-weight adults was 4.9% in the Northeast and Southeast. In the rural Northeast, a percentage of 7.1% was identified, which would justify monitoring it. A national survey by the IBGE in 2002-2003 confirmed that the problem was almost under control throughout country (IBGE,[9] 2004).

For comparison purposes, the mean level of low-weight adults in Mexico is 9%, in Haiti around 20%, in Ethiopia around 40% and in India it reaches 50% of the

*Schwartzman S. A lição dos números. Interview in the magazine Veja, July 13, 1994 (yellow pages).

population.[14] In a historical follow-up of indicators of the nutritional condition of the female population in Brazil, Monteiro et al[15] (2004) described the nutrition transition in this country. According to these authors, as in other countries, Brazil has been going through profound changes in the nutritional profile of its population over the last quarter century. The trends observed point towards a reduction in the importance of low weight and increased relevance of overweight, particularly in low-income populations. The women with BMI=18.5kg/m^2 (low weight) and =30kg/m^2 (obese) among the poorest and richest 25% in 1975, 1989 and 1997 were identified. The prevalence of low weight among the poorest went down from 17.1% to 9.5% between 1975 and 1997, while the prevalence of obese women in the same group went up from 4.7% to 12.6%. In the female population as a whole, the prevalence of low weight in the most recent survey was 6%, while obesity rated 12.7%.[15]

Other studies from the same group[16] indicate that the increase in obesity is of great importance in most developing countries.

The studies described aforementioned do not support any public policy that presupposes the predominance of hunger, *strictu sensu*, i.e. chronic energy deficiency.

The public perception of hunger and the Zero Hunger program

In the official document on the Government's Food Security Policy, the following points are highlighted: "We need to beat hunger, misery and social exclusion. Our war is not to kill anyone – it is to save lives"; and "Today, almost one-third of the Brazilian population goes hungry".*

Fome Zero is the federal government's main social program and, up to the end of 2005, it had spent around R$27 billions.** The program includes 31 actions and subprograms, and the main one is the so-called "*Bolsa Família*", which was created in 2004 and accounts for more than 50% of the budget. Data from the program assume that 58.6% of poor families in the country are being attended by the *Bolsa Família*.

The program was created in 2001,*** but its origins are much older than this. The question of hunger in Brazil took on a political character prior to a scientific one. This is reflected in the permanence of the subject among economists and social scientists in the present scientific literature. The work by Castro[2] (1946), "Geografia da fome" (Geography of hunger), may be considered to be the starting point for the discourse regarding hunger. This author is often cited by academic sectors involved in intellectual production regarding hunger, although this discourse has, from an institutional point of view, followed a pathway that is more political than scientific. Castro was president of the Food and Agriculture Organization (FAO) between 1952 and 1956.

Conceived to promote food and nutritional security for Brazil, the *Fome Zero* program had two strands: one intellectual, the other regarding mobilization. Since the 1980s, there have been campaigns related to fighting hunger that have mobilized broad sectors of society in actions for donation and distribution of food. In 1993, the National Council for Food Security was created, which still exists today.

There is evidence that the intellectuals involved in creating the program had knowledge of the epidemiological studies on hunger in Brazil. The decision to ignore this literature was justified by downgrading its intellectual value on the basis of other measurements of hunger.

According to WHO,[19] BMI of less than 18.5kg/m^2 is the most appropriate way of assessing the incidence of hunger, understood as chronic energy deficiency. On the other hand, the authors of the program considered that BMI below this reference level reflected the continuous effect of hunger in such individuals, but possibly did not include vulnerable people who ate irregularly without suffering weight variations.****

There are two other ways of obtaining statistical data on hunger within a given geographical area. The indirect method, which is used by many researchers and was adopted by the technical experts of the *Fome Zero* project, consists of calculating the per capita monetary cost of the intake of a certain quantity of food that is the minimum for survival, and comparing this figure with the individuals' income. Income below this cost would indicate a deficit, thus placing these individuals in a situation of risk.[1] Therefore, the mean weighted poverty line for Brazil (R$71.53 per person) indicates the existence of 46 million people with an mean available income of R$39.11, or 9.9 million families (with an average of 4.7 persons) with an income of R$183.81. It can be said that the people in these families do not have enough income to ensure their food security.[1] This is the origin of the cabalistic number of 40 million hungry persons, and not the number of low-weight individuals.

*Política de Segurança Alimentar. Available from http://www.fomezero.gov.br/download/Seguranca_Alimentar.pdf [access in 2006 Jul 12]
**US$1.00≅R$2.50 (mean value in 2005)
***Available from http://www.fomezero.gov.br/download/livro_projeto%20fome.pdf [access in 2006 Jul 12]
****Instituto Cidadania. Programa Fome Zero: uma política de segurança alimentar para o Brasil. 2001. p. 17.

This concept has been maintained throughout the stages of implementing the program, according to publications gathered from the official site of *Fome Zero*, from 2002 to 2006. These papers reflect the perception of those speaking for and defending the program in their communications with society. These papers are classified according to topics: hunger, food security, *Fome Zero* program, *Bolsa Família* program and poverty (Table 1).

It can be seen that, in 2006, there were no more papers published on hunger, and the focus of attention was turned towards the *Bolsa Família* subprogram.

The papers listed on the site are predominantly signed by institutional figures and represent the way in which the government sees itself publicly portrayed by society.

Epidemiology of obesity in Brazil

Between 1998 and 2002, the scientific production on the epidemiology of obesity increased from 1.1% to 1.5% (Landi,[11] 2005).

Table 2, which has been extracted from the report "Indicadores de Ciência, Tecnologia e Inovação em São Paulo 2004" (Indicators of Science, Technology and Innovation in São Paulo 2004), from *Fundação de Amparo à Pesquisa do Estado de São Paulo* (Fapesp - State of São Paulo Research Foundation), shows the percentages of scientific publication in Brazil and in other countries (Landi,[11] 2005).

Table 1 - Papers published in the media, by topic. Official site of the Fome Zero program, 2006.

Topic	2002*	2003	2004	2005	2006**
Hunger	4	14	4	7	-
Food security	-	9	6	1	-
Fome Zero	2	11	6	4	-
Bolsa Família	-	-	3	7	5
Poverty	2	1	1	4	-
Others	-	31	79	90	15
Total	8	66	99	113	20

*Only November and December
**Up to March

To examine the profile of scientific production in the field of nutritional epidemiology, and particularly on obesity in Brazil, which is regarded as a relevant problem by the scientific community, a bibliographic search was carried out in ISI/Thomson Scientific database. The search strategy included the term "Brazil" in the address field of at least one of the authors, in order to characterize the Brazilian production, and the term "obesity" in the subject field.

In relation to the topic of obesity within the field of nutritional epidemiology, Brazil represents 2.3% of the world production and occupies twelfth place in production. This

Table 2 - Percentages of indexed publications in the database of the Institute for Scientific Information (ISI/Thomson Scientific), according to field of knowledge. Selected countries, 1999 (extracted from Landi,[11] 2005).

	Total N	Total %	Med	Phys	Biomed	Chem	Biol*	Eng	Earth and space**	Social science	Math	Psyc	Others***	Health
World	528,643	100	29.0	15.3	14.7	12.5	7.0	6.8	5.4	2.7	2.0	2.0	1.8	0.9
Over 5%														
United States	163,526	30.9	32.2	10.4	17.0	7.6	6.1	5.8	6.1	4.2	1.8	3.4	3.8	1.5
Japan	47,826	9.1	30.0	21.2	14.5	16.0	5.9	7.9	2.5	0.4	1.0	0.4	0.1	0.1
Germany	37,308	7.1	29.6	18.9	14.9	14.7	5.5	5.8	4.8	1.4	2.1	1.5	0.6	0.2
United Kingdom	39,711	7.5	34.0	11.0	14.4	9.3	6.8	6.0	5.6	4.6	1.5	2.7	2.4	1.7
France	27,374	5.2	27.7	18.2	15.4	14.0	5.4	6.0	6.4	1.4	4.0	0.9	0.4	0.1
From 2 to 5%														
China	11,675	2.2	10.0	27.1	9.3	26.0	4.2	14.3	4.3	0.5	3.6	0.2	0.4	0.1
Canada	19,685	3.7	29.8	7.3	15.6	8.5	11.3	7.2	7.3	4.1	1.9	3.6	1.9	1.5
Spain	12,289	2.3	24.7	14.4	14.1	19.0	11.8	4.7	5.8	1.1	3.0	0.7	0.5	0.2
Australia	12,525	2.4	29.8	8.0	13.5	8.1	14.7	5.3	7.7	4.2	1.8	2.9	2.0	1.9
India	9,217	1.7	13.8	19.2	14.6	25.9	6.8	11.0	5.4	1.3	1.2	0.1	0.4	0.1
Up to 2%														
South Korea	6,675	1.3	16.5	25.2	9.1	20.8	3.4	18.9	2.4	0.8	2.0	0.2	0.6	0.1
Brazil	5,144	1.0	23.0	23.3	14.8	11.9	10.3	6.2	4.7	1.0	2.1	0.7	0.4	1.6
Mexico	2,291	0.4	22.1	21.9	12.4	10.7	13.5	5.8	8.4	1.5	1.9	0.9	0.5	0.5
Argentina	2,361	0.5	24.2	18.7	13.5	14.0	16.1	4.6	5.2	0.9	1.7	1.0	0.1	0.1
Chile	879	0.2	33.6	8.9	13.1	11.8	14.2	3.3	9.9	1.2	2.8	0.7	0.4	0.1

*Includes: agriculture and food science, botany, zootechnology, ecology, entomology, general biology, general zoology, marine and hydrobiology, biology (miscellaneous), zoology (miscellaneous).
**Includes: astronomy and astrophysics, earth and planetary science, environmental science, geology, meteorology and atmospheric sciences, oceanography and limnology.
***Includes: communication, education, biblioteconomy and information science, law, administration and business, social assistance and other professional fields.
Notes:
1) In this table, the classification adopted for publications per field of knowledge is from the National Science Board. In the rest of the chapter, the classification adopted is from the Institute for Scientific Information (ISI) for the product "Essential Science Indicators".
2) In the case of the United Kingdom, it includes publications from England, Wales, Northern Ireland, Scotland and Great Britain. On the other hand, for consultations by the research team (NIT/UFSCar) to the source of data in graphs 5.2, 5.16, 5.18 and 5.26, England was considered separately.

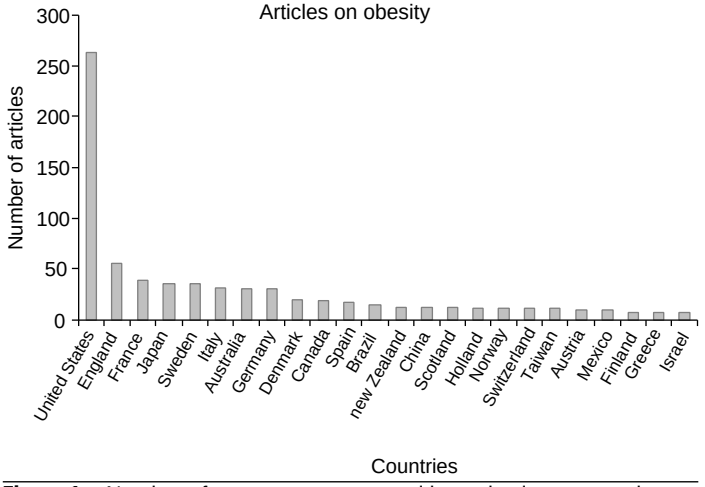

Figure 1 - Number of papers per country with production greater than or equal to 1% of world production in nutritional epidemiology on the topic of obesity.

participation qualifies the field as among those with the greatest visibility.

Figure 1 shows the countries with production greater than 1% of the world total.

The Brazilian scientific production on obesity is recent in comparison to the world production, as seen in Figure 2. It started in the 1980s, and underwent a significant increase from the year 2000 onwards. The reason why the curve trend for Brazil is out of step with the international trend is related, on the one hand, on the internationalization of the Brazilian scientific community. On the other hand, from the 1980s onwards, the nutritional transition pointed towards obesity as an epidemiological phenomenon of general reach in Brazil.

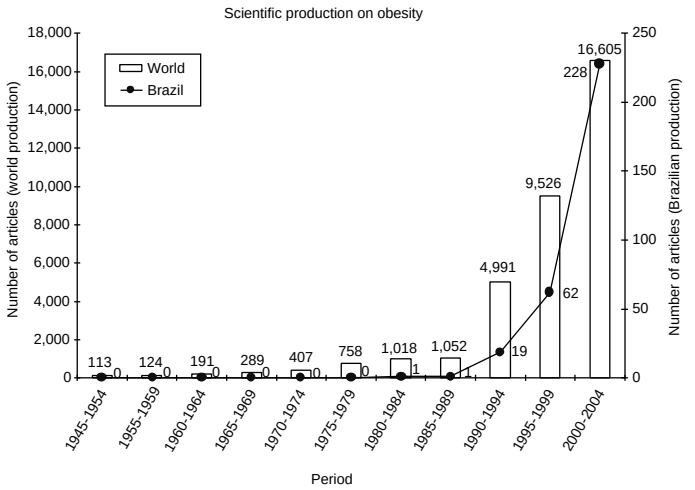

Figure 2 - World and Brazilian scientific production in journals indexed by ISI//Thomson Scientific between 1945 and 2004 within nutrition epidemiology on obesity.

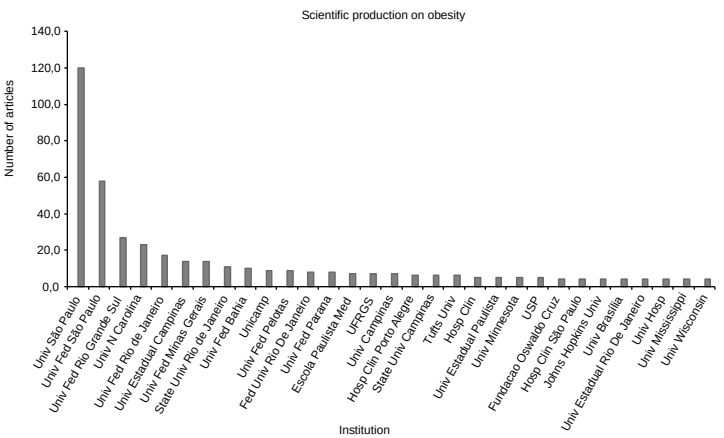

Figure 3 - Scientific production on obesity, according to institution, in journals indexed by ISI/Thomson Scientific. Brazil, 1947-2004.

The scientific production on this subject is concentrated in a few institutions: *Universidade de São Paulo* and *Universidade Federal de São Paulo* account for 34.1% of all publications over the period 2000-2004. The remaining production is divided among 97 other institutions (Figure 3).

Final considerations

Monteiro[14] (2003) considered that part of this problem comes from an inappropriate equivalence made between poverty, malnutrition and hunger by the interlocutors of the public debate. This would derive from the lack of knowledge of or disregard for data that has been produced by the IBGE since the 1970s.

The use of the term "hunger" within an inappropriate conceptualization in the *Fome Zero* documents shows that the problem goes beyond this inappropriate equivalence. In the analysis of official texts, it became clear that the writers knew of the definitions adopted by WHO and decided to ignore them, opting for indirect measurements for hunger. If there are not more than 40 million low-weight individuals in Brazil, this is because, even though the income measurement points towards insufficient food purchasing power, these people are obtaining food somehow. It can be understood that the authors of the program took the political nature of popular mobilization regarding

hunger as the basis for the program for two reasons: the emotional appeal to empathy and urgency. To say that 40 million Brazilians are living in a state of chronic hunger is to say that one in every four Brazilians is in need of immediate strong emergency action in order ensure their survival.

To produce this effect of mobilization against catastrophe, it was necessary to ignore the scientific evidence that was inconvenient from the point of view of political interests. However, scientific knowledge can provide the basis for decision-making regarding the food situation in this country.

This knowledge, which is more directly applicable, is being produced by a scientific community with relatively high international visibility in relation to the national production. This is a phenomenon that brings together desirable characteristics in terms of scientific excellence and applicability. If the application of this scientific knowledge of direct applicability and high credibility becomes obstructed through the policies that are formulated, the whole process of confirmation of this space for Brazilian science will be jeopardized, as observed in the questions of hunger and obesity. The future for the practical application of research results from nutritional epidemiology in Brazil depends on the dynamics of the political agendas regarding hunger and nutrition, and the dynamics of sectors related to these agendas.

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