

36. Turra LF, A Ramos, D Pires, F Rocha, G Rego, P Collety, R Luiz, S Costa 1992 *Vivendo e aprendendo: Prevenção da AIDS em escolares do Município de Angra dos Reis*. Núcleo de Estudos de Saúde Coletiva, Centro de Saúde Coletiva da UFRJ e Secretaria Estadual de Saúde, Rio de Janeiro, Report, Convênio PMAR/UFRJ, Rio de Janeiro
37. Monteiro S, AC Almeida, V Schall, AB Rodrigues, A Silva 1993 Investigating knowledge and attitudes of elementary students. *Annals IXth International Conference on AIDS*, Berlin
38. Standard, Ogilvy, Mater 1993 Uma convocação social: a guerra contra a AIDS. *Listening Post* 67: Fevereiro
39. At the end of the project period the Department of Education of Belo Horizonte solved their difficulties and asked ABIA for assistance. ABIA then made some recommendations and suggested that they make contact with Itabira, as one of the proposals of the project was to share the project experience with other cities
40. In May 1995, Palmas organized a Seminar about AIDS Prevention and invited ABIA, the other municipalities and the Save the Children representative to go. Only Florianópolis could not attend the invitation
41. IBGE (Instituto Brasileiro de Geografia e Estatística) 1989 *Crianças e adolescentes: indicadores sociais*, Vols 3 e 4, Rio de Janeiro
42. *Jornal do Brasil* 1995 MEC anuncia revolução no ensino de 1º grau, January
43. *Jornal do Brasil* 1995 MEC fará testes para avaliar ensino básico, January
44. This evaluation has already begun. *Jornal do Brasil* 1996 MEC conclui que 2º grau é "trágico". November, 26
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A missing agenda in Brazilian schools: The debate on popular health practices

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Popular health practices are an expression of the Brazilian popular culture but the debate about them has not been present in our schools. Such debate should be initiated in they may so that schools play a role in promoting all types of knowledge on health and become places where a more realistic and multifaceted view of our culture is portrayed. In this research, questions were asked to teachers and students in order to assess the frequency of references to the use of popular health practices as well as to compare these references based on: The nature of these practices; students' ages and grades; the type of school; and teachers' level of proficiency in health. The results evinced that: 1) These practices are learned informally; 2) homemade medicine is more referred to than folk healers and prayers; 3) as students progress in grades they become less likely to believe in and exemplify these practices and 4) teachers, specially science and health teachers, tend to believe less in and provide less information on these practices than students. The authors stress the value of popular health practices and describe the findings in the light of some research and pedagogical recommendations.

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As práticas populares de saúde são expressão da cultura popular brasileira, mas não estão presentes no currículo de nossas escolas. O debate sobre estas práticas deveria ser incentivado nas escolas a fim de que elas atuem na promoção de variados tipos de conhecimentos de saúde e passem a retratar uma visão mais realista e ampla de nossa realidade cultural. Nesta pesquisa, investigamos entre professores e alunos a frequência de referências ao uso de práticas populares de saúde e também comparamos estas referências considerando a natureza diversa das práticas referidas, a idade e série dos estudantes, o tipo de escola freqüentada, e o nível

de proficiência de conteúdos em saúde lecionado pelos professores. Os resultados demonstram que: 1) Estas práticas são aprendidas informalmente; 2) as práticas de remédios caseiros são mais referidas do que as de curandeiros e rezas; 3) à medida que os estudantes avançam na escola, eles se tornam menos propensos a acreditar e exemplificar estas práticas e 4) professores, especialmente os de ciências e de saúde, tendem a acreditar menos e fornecer menos exemplos sobre estas práticas do que seus alunos. Os autores enfatizam o valor das práticas populares e descrevem os resulta

Popular health practices have been an essential expression of the Brazilian popular culture. Considering that information about them has not been present in the curriculum of Brazilian schools, and thus are not usually discussed, we believe that the debate on popular health practices is a missing agenda in our schools. It is our assumption that if this debate is brought to the schools, it can ensure that schools will be portraying a more realistic and multifaceted view of our culture and positively valuing informal education.

This research started from the premise that schools should promote all types of knowledge on health to increase the students' possibilities of having primary information useful for their well-being. It could also contribute to expand the students' views of the intricate relationship between culture and health choices.

This article aims to describe not only the frequency of references to the use of popular health practices among students and teachers but also the comparisons of these references based on: Their diverse nature (homemade medicine, folk healer and prayer); the students' ages and grades; the type of school (public versus private), and the teachers' proficiency in health knowledge (elementary school teachers versus health and science junior-high school teachers). It is beyond the scope of this paper to assess the interviewees' motivation and the evaluation of the efficacy of mentioned practices, aspects which would demand further qualitative research.

The results regarding popular health practices evinced that they are learned informally in Brazil by many of the population interviewed. Thus, the lack of inclusion of popular health practices in the school curriculum does not mean they are absent from minds and/or daily practices of many students and teachers.

Formal education needs to value other forms of education

Education can be either formal, nonformal or informal (1). Education is called formal when it is long-term, degree oriented, and the objective is clearly stated. Formal education is structured by a staff of professionals who know how to teach but not necessarily how to do what is taught. Schools and universities are the locus where formal education takes place. Education is nonformal when it is short-term, nondegree oriented, and the objective is clearly stated as the learning of a

skill. Nonformal education is conducted by professionals who know how to do what they teach, and occurs in institutions of various kinds including schools and universities. Education is informal when it means learning in the process of living which can happen anywhere.

Although formal education in our century has provided more status and privilege than the other two forms, it must be recognized that all educational forms have always been blended in individual and societal development. Advances in worldwide communication media have been leading nonformal and informal education to exert even more important roles in the individuals' lives in the last few decades. Thus, it is imperative that schools become progressive through the inclusion of discussions on the teachers' and students' experiences (2). In dealing with any specific issue, schools should value the diverse forms of education, as well as, how individuals experience them. The schools' attempt to integrate all three forms of education requires that they concretely devote time to debates in their syllabus.

Health development and science: A dominant view

Scientific omnipotence prevails whenever science has been considered dogmatic and unquestionable. Regarding health development, Stone (3) gives a historical overview of this situation. According to this author, in the 1940's and 1950's, the scientific knowledge in terms of health development has been considered a superior knowledge that villagers should adopt since this assimilation into local culture would show their rationality. Stone identified the creation of new conceptualizations with time. During the late 1970s, two views of culture emerged. One of them, more dogmatic, defined culture as an obstacle to the introduction of new ideas and local people were seen as ignorant for not accepting scientific medicine. The other view, less dogmatic, considered culture as a local knowledge which tried to integrate old (traditional or popular) and new (scientific) health care practices.

In the 1980's, an even less dogmatic approach appeared in which criticism was directed no longer only to local cultures, but also to the cultures of health organizations, health bureaucracies and international development. This approach is exemplified by social sciences, like medical anthropology, which bases the reevaluation of its own scientific standards in light of popular knowledge (4).

While local cultures are receiving more attention, scien-

tific medicine is undergoing a crisis regarding its dominant paradigm. Queiroz (5), among others, asserts that this crisis relates to its failure in recognizing social, cultural and historical roles in the determination of diseases and their treatment. Inequality of production, distribution and consumption of medical care, iatrogenic diseases, viral and bacterial resistance, dependence generated by drugs, and the growing medical specialization that diverts attention from the totality of the human being, are some of the "symptoms" of medicine's paradigm crisis. In addition, another noticeable sign of this crisis is the middle and upper classes' growing interest in alternative health practices and religious systems of cure, reflected in a recent international campaign launched by WHO and UNESCO valuing these practices (6).

The hegemony of science in Brazil

In the Brazilian society, health practices defined as scientific have usually been legitimated. Costa (7) provides a historical analysis of the support received by the scientific medical model in Brazil through a hygienic pedagogy, which permeates everyone's lives and uses the family as a controlling institution. However, the hegemony of scientific knowledge has not been translated into scientific medical treatments accessible to all. The poor population in Brazil is the most likely to be excluded from scientific medicine, and popular health practices have been in many cases the only alternative to health care as Scheper-Hughes' (8) study showed in Pernambuco, Brazil.

In other areas, the poor population is being exposed to indiscriminate pharmaceutical prescriptions, and has strongly internalized western medical practices and discourse as the only trustworthy health alternative. Data on psychotropic drug use among rural workers in Espírito Santo, Brazil suggested devaluation of previous commonly used natural teas as medication against stress (9). This author discusses the overwhelming influence of medical consultations on the population health view, and the pervasiveness of multinational pharmaceutical interests in health choices. Cordeiro (10) and Thébaud and Lert (11), among others, explain the pressure of these interests resulting from the capitalization of medicine. In countries like Brazil, submitted to a late and accelerated industrialization, medical practices unfortunately tend to appear not only as a result of social needs, but also due to market strategies.

Research context of this study

This study began within the Fundação Oswaldo Cruz, in the Department of Biology, specifically the Laboratory of Environmental and Health Education, which has investigated several issues of health knowledge among the population with the aim to improve its health status. Some of the results of research carried out in this laboratory have been transformed into the development of educational materials for health prevention.

The study on popular health practices is part of a larger research project investigating health issues among teachers and 1st to 8th grade students from several regions of Rio de Janeiro (12,13). The results analyzed in this paper refer to the northern part of Rio de Janeiro municipality. In this region, ten schools were selected, five of them public and five private. While the selection of public schools attempted to account for the various social strata of the region, the selected private schools were geographically close in order to provide populations as similar as possible to the public schools. This was done because private schools, by their very nature, tend to have more affluent populations.

The sample of teachers selected encompassed those who taught health issues (elementary teachers and only junior-high teachers who taught issues related to health and/or science). The original open-ended questions related to popular health practices are listed in the Appendix. There were no closed-form questions addressing popular health practice issues.

Three types of questionnaires were designed: For teachers, for students from 3rd to 8th grades and for students from 1st to 2nd grades (13). These questionnaires were pretested and included the following topics: Socioeconomic and educational background; concepts of health and illness; nutrition and health patterns; first aid knowledge; personal hygiene habits; knowledge about Brazilian tropical diseases; consumption of drugs, alcohol and cigarettes; pollution and conservation of the environment; mental health; homemade medicine, folk healers and prayers; attitudes and opinions. In this paper we are only analyzing the topics related to homemade medicine, folk healers and prayers.

While teachers and students from 3rd to 8th grades were given written questionnaires, students from 1st and 2nd grades were interviewed orally due to their lack of writing ability. The procedure to interview young children about ideas and behaviors related to health has been reported, among others, by Gochman and Saucier (14) and Lau and Klepper (15). Theoretically, this research is based on Vygotsky's social constructivism which takes into account the social and cultural context in building knowledge of concepts in general and scientific concepts at school (16,17). Vygotsky's theory is a framework of reference for those working with young children since he considers that the learning process does not necessarily correspond to children's development because the former does not need to coincide with the latter but can precede it. Vygotsky even stressed that educational intervention could be ahead of the next phase of children's development (18), and suggested the existence of a "proximal

Table 1 - Age distribution of students interviewed according to type of school.

Age	6	7	8	9	10	11	12	13	14	15	16	17	18	No.
PUS	0	5	14	15	21	20	31	20	25	26	15	1	0	3
PRS	4	15	19	18	23	22	22	15	23	18	5	2	2	10
Total	4	20	33	33	44	42	53	35	48	44	20	3	2	13

PUS = Public schools; PRS = Private schools.
Mean (\bar{x}) = 11.69; Median (Md) = 11.5; Mode (Mo) = 12

Table 2 - Grade distribution of students' answers to whether homemade medicine is used at home.

	1st N	2nd N	3rd N	4th N	5th N	6th N	7th N	8th N	Total N (%)
Yes	41	45	32	34	32	32	32	36	284 (72.1)
No	9	6	18	13	13	15	11	5	90 (22.8)
DNK, NA, AW	0	0	2	2	7	4	2	3	20 (5.1)
Total	50	51	52	49	52	51	45	44	394 (100.0)

DKN = Does not know; NA = No answer; AW = Awry.
 $\chi^2(Y \text{ and } N) = 14.8$; $\chi^2 p = 14.1$; $\alpha = 0.05$; $\chi^2 p < \chi^2$
 $p = 0.03$

Table 3 - Answers to health related reasons for using homemade medicine.

Examples/ Number of times	Students		Elementary school teachers	
	231 N	(58.6%) (%)	31 N	(31.9%) (%)
Accidents				
Sprains	2	(0.6)	0	(0.0)
Swells	1	(0.3)	0	(0.0)
Wounds	3	(0.9)	0	(0.0)
Physical diseases				
Bronchitis	6	(1.8)	0	(0.0)
Chicken pox	5	(1.5)	1	(1.0)
Cold	44	(13.3)	12	(23.5)
Dengue	2	(0.6)	0	(0.0)
Furuncle	2	(0.6)	0	(0.0)
Hepatitis	4	(1.2)	0	(0.0)
Influenza	34	(10.3)	7	(13.7)
Intestinal worms	2	(0.6)	2	(3.9)
Measles	5	(1.5)	2	(3.9)
Mumps	4	(1.2)	0	(0.0)
Pediculosis	0	(0.0)	3	(5.9)
Pharyngitis	0	(0.0)	1	(1.9)
Whooping cough	2	(0.6)	1	(1.9)
Others ^a	3	(0.9)	0	(0.0)
Physical symptoms				
Backache	3	(0.9)	0	(0.0)
Colic	6	(1.8)	1	(1.9)
Cough	29	(8.8)	2	(3.9)
Diarrhea	3	(0.9)	4	(7.8)
Ear problems	4	(1.2)	1	(1.9)
Fever	30	(9.1)	1	(1.9)
Headache	31	(9.4)	0	(0.0)
Hoarseness	4	(1.2)	0	(0.0)
Kidney problems	3	(0.9)	0	(0.0)
Leg problems	2	(0.6)	0	(0.0)
Liver problems	6	(1.8)	0	(0.0)
Mucus	2	(0.6)	1	(1.9)
Nausea	1	(0.3)	1	(1.9)
Stomach ache	61	(18.4)	8	(15.7)
Throat problems	6	(1.8)	2	(3.9)
Tooth ache	4	(1.2)	0	(0.0)
Vomiting	5	(1.5)	0	(0.0)
Others ^b	4	(1.2)	0	(0.0)
Psychological symptoms^c	2	(0.6)	3	(5.9)
Physical health objectives^d	3	(0.9)	0	(0.0)
Psychological health objectives				
To calm down	3	(0.9)	0	(0.0)
Total	331		51	

^a Allergy, pneumonia and rubella.

^b High blood pressure, knee problems, itches and lumps.

^c Being nervous, unable to perform and a father who is crazy.

^d To have breast milk, to loose weight and to sleep better.

development zone” instead of rigid development stages (16,17).

The interview procedure with 1st and 2nd grade students was semistructured, attempting to resemble a dialogue in which the questions could be rephrased if the students did not understand them and the order of the questions could be modified. The researchers were trained so that the interview procedure followed a homogenous pattern. Changes in rephrasing the question or order employed had to be recorded in the questionnaire and always discussed by the research team.

The data analysis of the information gathered attempted to capture truly the meanings reported by the population interviewed. The open-ended answers were analyzed through a process of successive categorizations which consisted in defining categories, generating coding rules and discussing the coding system produced with the research team as well as external consultants (19). This process resulted in many categories, those for popular health practices being shown in Tables 3, 4 and 7. Thus, validity and reliability for both interviewing and categorization processes were sought through accuracy and consistence.

The population interviewed

The number of teachers interviewed was 117 (97 from 1st to 4th grades and 20 from 5th to 8th grades who taught science or health classes). Interviewees were predominantly women (96.2%), with ages ranging from 19 to 49 years. Many of them (48.5%) had completed undergraduate studies, 24.6% had started undergraduate studies, and the remaining 22.3% had only finished high school. About 40.0% of these teachers lived in the districts where the schools they taught were located.

The population of students interviewed from 1st to 8th grades consisted of 394 (200 boys and 191 girls and 3 without data). The students' ages ranged from 6 to 18 years. As it usually happens in Brazil, public schools had on average older students than the private ones (Table 1).

Homemade medicine: A rich variety

Comparing students from public and private schools, there was no significant difference between utilization of homemade medicine ($\alpha = 0.05$; $\chi^2 = 1.6$; $p > 0.05$). This result shows that school type was an independent factor regarding whether the students would provide a positive or negative response to this question. In addition, while 124 students from public schools gave examples of homemade medicines a comparable number, 107, of private school students also provided examples.

Nevertheless, there is an important difference among grades evinced through the χ^2 test (Table 2), indicating that grade is a dependent factor regarding the students' responses.

As for the student progress in school, he/she becomes less likely to assert a positive answer to the use of homemade medicine. Such results might be related, to some extent, to the use of oral interviews with only 1st and 2nd grades (Table 2).

In any case, it is quite interesting to note that students from 1st and 2nd grades account for the majority of positive answers regarding homemade medicine practice (85.14% of all students' answers) while they are only 25.6% of the student population.

The reported examples of homemade medicine practices (Tables 3 and 4) reveal a rich variety of reasons for their use as well as elements employed in their preparation. Examining the categories of answers on Table 3, it is revealing that the population placed emphasis on physical dimensions of disease. Although it is not clear if interviewees were less informed or even embarrassed to discuss other dimensions, it can be argued that this focus, to some degree, supports the scientific medical model which clearly favors the physical aspects of health and illness rather than psychological ones.

Analyzing Table 4 we see that the rich diversity of elements used concentrates on plants. The students' knowledge of so many plants is amazing considering that they are urban children. It is possible to infer that their parents and/or grandparents have rural backgrounds due to the recent urbanization of Brazil. Thus, more qualitative research is needed to explain why and how students learn informally so much about plants and homemade medicine.

Among the elementary school teachers, 41.2% believed in the use of homemade medicine, 34% did not and the remaining 24.7% were uncertain. The majority of those who believed (31.9%) provided examples of elements used in homemade medicine.

Of the junior-high school teachers, 40% believed in homemade medicine, 50% did not and 10% were uncertain. Contrary to the expectation that junior-high school teachers involved in health and science subjects - if they believed in these practices - would be more prone than elementary school teachers to supply examples, it did not happen. Only 20%, half of the believers, provided examples, so few in number that they were not included in Table 3. This might suggest that elementary school teachers are more familiar with and/or less prejudiced against homemade medicine.

Another interesting comparison relates

Table 4 - Students' answers regarding homemade medicine elements.

Examples/ Number of times	1st and 2nd grades		3rd to 8th grades		Total	
	N	(%)	N	(%)	N	(%)
Fruits and trees						
Pitanga (<i>Eugenia uniflora</i>)	2	(2.0)	0	(0.0)	2	(0.8)
Guava (<i>Psidium guajava</i>)	2	(2.0)	1	(0.8)	3	(1.2)
Lemon (<i>Citrus limon</i>)	5	(5.0)	5	(4.2)	10	(4.1)
Orange (<i>Citrus aurantium</i>)	9	(9.0)	7	(6.0)	16	(6.6)
Others ^a	-	-	4	(1.6)		
Plants						
Acre stone crop (<i>Sedum acre</i>)	16	(16.0)	24	(20.0)	40	(16.5)
Bay leaf (<i>Ocotea</i> or <i>Nectandra</i>)	1	(1.0)	1	(0.8)	2	(0.8)
Boldu tree (<i>Peumus boldus</i>)	17	(17.0)	19	(16.0)	36	(14.8)
Chamomile (<i>Anthemis</i> spp)	2	(2.0)	1	(0.8)	3	(1.2)
Common balm (<i>Mellisa officinalis</i>)	6	(6.0)	9	(7.6)	15	(6.2)
Cinnamon (<i>Ocotea</i> or <i>Nectandra</i>)	2	(2.0)	0	(0.0)	2	(0.8)
Iwarancusa grass (<i>Cymbopogon jawarancusa</i>)	2	(2.0)	0	(0.0)	2	(0.8)
Fly-roost leaf flower (<i>Phyllanthus niruri</i>)	0	(0.0)	3	(2.5)	3	(1.2)
Mate (<i>Ilex paraguayensis</i>)	3	(3.0)	0	(0.0)	3	(1.2)
Mint (<i>Mentha piperita</i>)	6	(6.0)	5	(4.2)	11	(4.5)
Red-gartered coot (<i>Fullica armillata</i>)	2	(2.0)	3	(2.5)	5	(2.0)
Anise (<i>Pimpinella anisum</i>)	8	(8.0)	6	(5.1)	14	(5.8)
Watercress (<i>Rorippa naturium-aquaticum</i>)	5	(5.0)	8	(6.8)	13	(5.3)
Others ^b	-	-	14	(5.8)		
Miscellaneous						
Garlic (<i>Allium scorodolprasum</i>)	1	(1.0)	3	(2.5)	4	(1.6)
Honey (<i>Melopossa fuscipennis</i>)	5	(5.0)	12	(10.2)	17	(7.0)
Milk	3	(3.0)	6	(5.1)	9	(3.7)
Onion (<i>Allium lusitanicum</i>)	2	(2.0)	1	(0.8)	3	(1.2)
Salt	0	(0.0)	2	(1.7)	2	(0.8)
Sugar	0	(0.0)	2	(1.7)	2	(0.8)
Others ^c	-	-	3	(3.3)		
Total	99		118		243	

^a Avocado (*Persea americana*), banana (*Musa paradisiaca*), passion fruit (*Passiflora*) and prune (*Prunus domestica*).

^b "Ararueira" wood (*Schinus molle*), belly spurge nettle (*Jatropha gossypifolia*), black tea (*Then sinensis*), cotton (*Gossypium barbadense*), daisy (*Chrysanthemum coronarium*), eucalyptus (*Eucalyptus resinifera*), dropseed grass (*Sporobolus asperifolius*), horse mint (*Mentha longifolia*), mountain arnica (*Arnica montana*), littleflower quickweed (*Galinsoga parviflora*), rosemary (*Rosmarinus officinalis*) and Saint Mary herb, white plant and light green plant.

^c In the others' category: Beet, codfish, animal (chicken) fat, earth, sweet pea, vinegar, water and wheat.

Table 5- Students' answers regarding whether there is the practice at home of treating any disease with a religious prayer or folk healer.

Grade	1st	2nd	3rd	4th	5th	6th	7th	8th	Total N (%)
	N	N	N	N	N	N	N	N	
Yes	19	19	14	10	7	10	4	7	90 (28.6)
No	18	17	18	13	29	28	30	21	174 (55.2)
DNK, NA, AW	3	5	10	11	5	5	5	7	51 (16.2)
Total	40	41	42	34	41	43	39	35	315 (100.0)

DNK = Does not know; NA = No answer; AW = Awry.

$\chi^2(Y \text{ and } N) = 25.8$; $\chi^2 p = 14.1$; $\alpha = 0.05$; $\chi^2 p < \chi^2$
 $p = 0.0005$

Table 6- Distribution of students' answers regarding whether they believe a person can be cured by a prayer.

Grade	1st	2nd	3rd	4th	5th	6th	7th	8th	Total N (%)
	N	N	N	N	N	N	N	N	
Yes	42	40	28	30	18	23	10	14	205 (52.0)
No	5	6	8	8	21	23	30	19	120 (30.5)
DKN, NA, AW	3	5	16	11	13	5	5	11	69 (17.5)
Total	50	51	52	49	52	51	45	44	394 (100.0)

DKN = Does not know; NA = No answer; AW = Awry.
 $\chi^2(Y \text{ and } N) = 71.8$; $\chi^2 p = 14.1$; $\alpha = 0.05$; $\chi^2 p < \chi^2$
 $p = 6.4695E-13$

to the nature of references. While students supplied examples of homemade medicine mostly for physical symptoms (61.6%), the teachers' references related mainly to physical diseases (54.9%). This implies that teachers know more than their students how to specify diseases. Nevertheless, for both students and teachers, the most important use of homemade medicine was to cure cold (13.3%; 23.5%) and influenza (10.3%; 13.7%) and to relieve the symptom of stomach ache (18.4%; 15.7%). In regard to elements employed in these health practices the results differed, with students quoting most frequently acre stone crop (16.5%) and boldu tree (14.8%), and teachers citing mainly lemon (6.0%), guava (4.5%) and anise (4.5%).

Further, comparing the number of responses given, the teachers' references were fewer than that of their students. While 117 teachers gave 67 references of problems that could be treated using homemade medicine, 394 students contributed with 331 references. Considering elements employed in popular health practices, these teachers supplied 35 indications, and the students 243.

Folk healers and prayers: Health as a multidimensional concept

No significant difference was found between answers given by students from public and private schools regarding their faith in folk healers ($\alpha = 0.05$; $\chi^2 = 0.5$; $p > 0.05$) or prayers ($\alpha = 0.05$; $\chi^2 = 0.1$; $p > 0.05$) demonstrating that school type is an independent factor regarding whether students answer affirmatively or not to these questions.

Furthermore, there is an important difference between students' answers regarding grades (Tables 5 and 6). The χ^2 tests shown in these Tables demonstrate that grade is a dependent factor regarding the students' responses about beliefs in folk healers or prayers, since these beliefs declined as they progressed to higher grades. For instance, while 47.5% of students from 1st grade said a folk healer or religious prayer can treat a disease, only 20% in the 8th grade did so. Also, concerning the belief that a person can be healed by a prayer, 84% of 1st graders were affirmative, against only 31.8% of 8th graders. Again, as in the case of responses regarding homemade medicine practices, the fact that 1st graders were more prone to believe in these practices than the remaining student population might be asso-

ciated to some degree with the use of oral interviews with only 1st and 2nd graders.

Psychological problems account for very few responses as opposed to physical ones (Table 7). This finding is surprising given that the literature (20) suggests that these healing practices tends to reduce anxiety and relieve psychological distress.

Yet, one fascinating aspect of Table 7 is that almost 30.0% of students' responses relate to the spiritual dimension. A few teachers (4 elementary and no junior-high school teachers) also go beyond the concept of health as defined by the World Health Organization (WHO) which encompasses the physical, psychological and social dimensions. Here, open-ended questions were used exactly to allow the emergence of different health understandings.

Table 7 - Distribution of students' answers that indicated problems that may be treated by prayers or by people with special talents to heal.

Examples/ Number of times	Prayers		Folk healers		Total	
	N	(%)	N	(%)	N	(%)
Accidents						
Fractures	1	(0.7)	1	(2.3)	2	(1.1)
Sprains	2	(1.5)	0	(0.0)	2	(1.1)
Physical diseases						
Blindness	3	(2.2)	0	(0.0)	3	(1.7)
Bronchitis	3	(2.2)	1	(2.3)	4	(2.3)
Cancer	3	(2.2)	0	(0.0)	3	(1.7)
Chicken pox	1	(0.7)	3	(6.9)	4	(2.3)
Cold	6	(4.5)	0	(0.0)	6	(3.4)
Deficiency	2	(1.5)	0	(0.0)	2	(1.1)
Herpes	7	(5.3)	5	(11.6)	12	(6.8)
Infantile paralysis	2	(1.5)	0	(0.0)	2	(1.1)
Measles	3	(2.2)	1	(2.3)	4	(2.3)
Mumps	14	(10.5)	3	(6.9)	17	(9.6)
Others ^a	9	(6.8)	2	(4.6)	11	(6.2)
Physical symptoms						
Backache	8	(6.0)	3	(6.9)	11	(6.2)
Headache	9	(6.8)	0	(0.0)	9	(5.1)
Fever	1	(0.7)	2	(4.6)	3	(1.7)
Swells	2	(1.5)	0	(0.0)	2	(1.1)
Toothache	3	(2.2)	1	(2.3)	4	(2.3)
Throatache	2	(1.5)	0	(0.0)	2	(1.1)
Vomiting	2	(1.5)	2	(4.6)	4	(2.3)
Wounds	2	(1.5)	1	(2.3)	3	(1.7)
Others ^b	4	(3.0)	3	(6.9)	7	(4.0)
Psychological problems						
Bad sleep	1	(0.7)	1	(2.3)	2	(1.1)
Nervousness	1	(0.7)	1	(2.3)	2	(1.1)
Others ^c	2	(1.5)	0	(0.0)	2	(1.1)
Spiritual						
Evil eye	29	(21.8)	8	(18.6)	37	(21.0)
Rituals	9	(6.8)	4	(9.3)	13	(7.4)
Treatments						
Surgery	1	(0.7)	1	(2.3)	1	(0.6)
Medical malpractice	1	(0.7)	0	(0.0)	1	(0.6)
Total	133		43		176	

^a Asthma, deafness, erysipelas, hernia, influenza, meningitis, mycosis, pneumonia, rheumatic fever, rubella and whooping cough.

^b Arm ache, body aches, constipation, diarrhea, fatigue, low blood pressure and stomach ache.

^c Being an alcoholic and having suicidal ideas.

Comparing answers: More coinciding patterns than dissimilar ones

Comparing the three types of answers, we find more parallel patterns than dissimilar ones. Examining all responses, the type of school did not elicit any difference even though students from public schools tend to be older than their counterparts in private ones. Thus, it seems that, regardless of age, there was homogeneity of the communities' cultures in which the schools were located, since private schools were chosen to attract populations as similar as possible to the public ones. Coleman's and Hoffer's (21) study which compared public and private schools in the United States found differences among high-schools related to distinct strength of community cultures.

The fact that students from the first two grades, rather than from higher grades, provided more examples to all questions, corroborates the results of elementary school teachers providing more examples than junior-high school teachers. These results support Loyola's (22) conclusions that more schooling was one of the factors, besides urbanization and youth, that led the population to adopt western scientific medicine and view popular or traditional medicine as an outdated practice.

Since regarding all responses, as the student progresses in school, he/she becomes more prone to share the view of modern science, it would seem that the school may be playing a role in spreading the hegemonic view of science, and in restraining the students' expression of popular health practice knowledge. This view is similar to that portrayed by Ivan Illich when criticizing the schools' role in promoting a type consciousness which only values the knowledge shown in the school curriculum (23). Despite the fact that health development and medical anthropology have grown to value local cultures, schools appear to still share the hegemonic view of science giving no attention to other kinds of knowledge. Other authors have argued that schools provide a general perception of scientific concepts which changes children's awareness of their mental processes (16,17,24).

Finally, another interesting aspect of this study is that among the answers on popular health practices, the responses related to homemade medicine were the ones that elicited more positive answers and examples both from teachers and students. It seems that the concreteness of homemade medicine led the population to identify more with them or to feel less embarrassment to discuss them. These practices are definitely more tangible than those that state relationships with religiosity, spirituality, disease and health.

Reasons for valuing popular health practices

Even though scientific medical services have undoubted validity in many instances, this is also true for popular health practices. First of all, popular health practices are important because they carry cultural heritage. For example, "curanderismo" in Mexico has been defined by Spector (25) as a medical system which encompasses elements of Aztec culture, Spaniard culture, spirituality, homeopathy and sci-

ence. In short, popular health practices are part of our cultural thinking heritage, anchored in systems of thoughts that have permeated human mind. Thus, instead of eliminating or devaluing not scientific health alternatives, it will be interesting to develop a historical analysis of human discoveries given by these different systems. Societies can only profit from the awareness about paths undertaken by men in order to continuously recreate their world.

The second reason why popular health practices should be valued is that they tend to materialize among the poor population. Popular health practitioners often emerge from their same social strata, thus having a common cultural background. Therefore, they may be more capable to help their fellow citizens, developing trust through a more effective communication than that provided by their outsider counterparts. Boulton et al (apud Reference 20) concluded that the resemblance between the social background of doctors and patients was likely to promote a more productive communication. Likewise, Szasz and Hollender (26) and Loyola (22) argued that patients seek and evaluate doctors not only for their expertise. The type of human relationship that can be developed in a patient/doctor encounter, in which doctors attentively listen to patients, providing explanations on symptoms, examinations and treatment is also germane.

The third reason why popular health practices should be endorsed is that, contrary to scientific medicine, they tend to share a holistic view of health and disease. In fact, popular health practices have in common the premise that health and disease are based on the relationship the body has with its different parts, and with the social and cultural context (5). According to this author, western medicine needs to recover this dimension to surpass its paradigm crisis.

Finally, popular health practices should be commended because they tend to be less costly than medical practices. However, this fact should not legitimate low quality care for the poor (27). Indeed, no population should be restricted to any practice, and access to scientific medicine should not be denied to the poor because of its costs. Furthermore, it is important not to romanticize the economic aspect of popular health practices which, according to Loyola (22) are inclined to hide their economic nature using the exchange of favors.

Recommendations for research and pedagogical practices

Vygotsky identified the role of formal education in teaching scientific concepts to children. By observing children in real life situations this author testified that children's initial spontaneous concepts evolve to scientific ones during formal education when children interact with scientific concepts. For Vygotsky, this process of concept change provides children with a new perception of themselves and their own mental processes, through the development of a self-reflective activity.

Formal education is an extra tool to teach the young the culture (values and ideas) of the adult world (28) and cultural experiences influence individual development in such a way

that the learning process involves thinking by social standards (16,17). Therefore, it can be argued that Brazilian schools may be promoting a kind of consciousness that discriminates the vernacular culture (23) when it excludes from its curriculum the cultural expression of popular health practices.

Despite this exclusion, this study revealed that they emanated from many student and teacher responses. The multiplicity of practices reported in this study depicts a complex phenomenon which warrants further studies. Thus in terms of research, additional studies of these practices' efficiency are suggested as well as their representations in the individuals' minds. It is advisable that new research be designed with more homogeneous methodological approaches than the present study, where differences in answers may reflect slight diverse methodologies used for teachers and students. Moreover, new investigations may use only oral interviews because these generally provided much more opportunity for describing the variety of these practices.

In addition, regarding research, we recommended attention to whether the questions proposed to interviewees support the dominant view of science. Our question line for popular practices places emphasis on diseases and neglects preventive issues. It is difficult to break through the hegemonic scientific view, and even the most traditional and religious discourses somehow relate to science (29).

In the classroom, it is imperative to discuss that popular health practices need further research to establish which practices are effective versus those that are not. Superstitions and wrong assumptions may also be solved by debates. Schools can play a role in warning students about the risks of incorrect dosages in any kind of health practice. Moreover, schools can play a role in explaining that even scientific knowledge is limited, has been attained by trials and errors, and needs further exploration.

In the classroom, one of the ways, teachers can discuss this knowledge is by supplying books and articles that deal with homemade medicine (30,31). Then, discussions can emerge on health and diseases issues together with the kind of herbs, fruits and other elements that have been suggested by these books and those that teachers or students have tried at home. The fact that no conclusion may be reached in many discussions is pedagogical because learning should be a constant process of verification which may open teachers' and students' minds to new inquiries. This is true specially in areas such as health practices about which all of us, including scientists, have much to learn.

Likewise, religiosity should be discussed in classrooms, utilizing instructional materials about religious affiliations and beliefs related to health and disease can foster debates. Meihy (32) argued that the display of religions in Brazil has been so strong that they merit to be evaluated as social practices.

Although, at times, religion has been portrayed as a subject beyond discussion, it should be pedagogical to discuss only the social dimensions of religious faith. Sharing these dimensions in an ecumenical environment was proved to be an effective tool to promote empowerment for Brazilian women (33).

Concerning spirituality too, it can be pedagogical to ex-

Appendix - The questions asked to 1st and 2nd grade students were the following: Your mother or someone at home uses teas or homemade medicine?; If so, for which disease(s)?; What plant(s) does she/he use?; Do you know it (them)?; Is (are) it (they) effective?; Do you think a prayer may heal a person that is ill?; If someone from your family gets ill, do you pray to help?; Is it usual for your family to treat any disease with a folk healer?; and If yes, for which disease(s)?

The question asked to 3rd to 8th grade students were: Do you think some diseases can be cured by homemade medicine?; Do you know of any disease that can be treated by prayers?; and Is it common for your family to treat any disease with a folk healer?

The questions asked to teachers were: Do you believe some child diseases can be cured by homemade medicine?; and Do you believe some diseases can be treated by certain people with special talents to heal?

Statements from second grade students: "I believe in homemade medicine. Yesterday my father made lemon concentrate for my sister's cough. I know that boldutree is good for stomach ache and that Saint Mary herb is good for intestinal worm". "I believe in prayers. I pray for people in my family. When I was ill, I prayed and I found relief".

Statements from a 8th grade student: "I believe in homemade medicine. Tea of "ararueira" wood is good for stomach ache and acre stone crop is good for swells and sprains".

Statements from elementary teachers: "No, I don't believe in homemade medicine. It is always better to seek medical advice."; "I believe people with special talents to heal can cure others mostly when the disease is psychological or spiritual."; "No, only medicine is capable to cure and treat diseases. There is no cure through homemade medicine, "curandeiros" or people with special talents to heal. These practices are all placebos... illusions."

plain to students that this is an area in which scientists need to create new frameworks of understanding so that it becomes less foreign to science and more understood by all. Meanwhile, teachers and students can discuss their different opinions of spirituality and the fact that opinions do not need to rely on scientific standards for their validation. ■

References and notes

1. Coombs PH 1985 *The world crisis in education. The view from the eighties*. Oxford University Press, NY
2. Freire P 1994 *Pedagogia da esperança. Um reencontro com a pedagogia do oprimido*. Paz e Terra, RJ
3. Stone L 1992 Cultural influences in community participation in health. *Sci Med* 35: 409-417
4. Uchôa E, JM Vidal 1994 Medical anthropology: Conceptual and methodological elements for an approach to health and disease. *Cad Saúde Publ* 10: 497-504
5. Queiroz MS 1986 The "mechanistic" paradigm of modern western medicine: an anthropological perspective. *Rev Saúde Publ* 20: 309-317
6. *Jornal do Brasil* 1996 *OMS e UNESCO resgatam medicina alternativa*, p 25. 1996 July 28, Brasília
7. Costa JF 1979 *Ordem médica e norma familiar*. Graal, RJ
8. Scheper-Hughes N 1984 Infant mortality and infant care. Cultural constraints on nurturing in Northeast Brazil. *Soc Sci Med* 19: 535-546
9. Rozemberg B 1994 The use of tranquilizers "attacks of bad nerves" among rural workers. *Rev Saúde Publ* 28: 300-308

10. Cordeiro H 1981 *Empresas médicas*. MSc Thesis, Departamento de Medicina Preventiva, Faculdade de Medicina, Universidade de São Paulo, SP
11. Thébaud A, F Lert 1987 Ciências sociais, saúde, e industrialização. *Ci Cult* 39: 123-127
12. Schall VT, P Jurberg, B Rozemberg, MC Vasconcellos, E Boruchovitch, ICF Sousa 1987 Health education for children: The project "Ciranda da saúde". *Proceedings IV International Symposium on World Trends in Science and Technology Education*, p 115-118. *Science and Technology and Quality of Life*, Kiel, Germany
13. Schall VT, P Jurberg, E Boruchovitch, IC Félix-Sousa, B Rozemberg, MC Vasconcellos 1987 Health education for children developing a new strategy. *Proceedings II International Seminar on Misconceptions and Educational Strategies in Science and Mathematics*, p 390-403. Cornell University, Ithaca, USA
14. Gochman DS, JF Saucier 1982 Perceived vulnerability in children and adolescents. *Health Educ Quart* 9: 46-142/59-155
15. Lau RR, S Klepper 1988 The development of illness orientations in children aged 6 through 12. *J Health Soc Behav* 29: 149-168
16. Vygotsky LS 1991 *A formação social da mente*. Martins Fontes, SP
17. Vygotsky LS 1993 *Pensamento e linguagem*. Martins Fontes, SP
18. Holmes B 1981 Education in Soviet Union, p 325-383. In *Comparative educational systems*. E Ignas, RJ Corsini eds, Peacock, USA
19. Boruchovitch E, VT Schall 1992 The use of questionnaires in a health educational research: Advantages and disadvantages of open-ended questions. Unpublished paper
20. Cockerman WC 1992 *Medical sociology*. Prentice Hall, NJ
21. Coleman JS, T Hoffer 1987 *Public and private schools*. Basic, NY
22. Loyola MA 1987 Medicina popular: Rezas e cura do corpo e da alma. *Ci Hoje* 6: 34-43
23. Illich I 1979 Vernacular values and education. *Teachers College Record* 81: 31-75
24. John-Steiner V, CP Panafosky 1985 Processus sociogénétique de la communication verbale, p 203-219. In *Vygotsky Ajourd'hui*. Delachaux & Niestlé, Paris
25. Spector R 1979 *Cultural diversity in health and illness*. Apleton-Century-Crofts, NY
26. Szasz TS, MH Hollander 1987 The basic models of the doctor-patient relationship, p 174-181. In *Dominant issues in medical sociology*. H Schwartz ed, Random House, NY
27. Ugalde A 1985 Ideological dimensions of community participation in Latin American Health Programs. *Soc Sci Med* 21: 41-53
28. Hurn CJ 1985 *The limits and possibilities of schooling. An introduction to the sociology of education*. Allyn and Bacon, Boston
29. Duarte LDF 1986 *Da vida nervosa nas classes trabalhadoras*. Zahar, RJ
30. Brilhante MLCS 1986 *Ciência e tecnologia e a expressão psicossocial do poder nacional*. Escola Superior de Guerra, RJ
31. Tompkins P, C Bird 1973 *The secret life of plants*. Penguin Books, NY
32. Meihy JCSB 1978 *Conceito de religiosidade popular*. Paulinas, SP
33. Sousa ICF 1995 Discussing women's reproductive health, religion, roles and rights: Achieving women's empowerment. *Convergence* 28: 45-51
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Geosciences and development: The role of the earth sciences in a sustainable world

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Following the principles contained in the Agenda 21, the main agreement reached during the UNCED-92, the future sustainable society shall exhibit an equitable socioeconomic development, all over the world, in harmony with the life support systems of our planet. The Earth Sciences have a crucial role, because they have the responsibility of the search, provision and management of mineral and energetic resources, the conservation and management of soils and water, the continuous monitoring of the dynamic processes of the Earth system, and the prevention and mitigation of natural disasters. Solidarity among peoples is needed in order to achieve a truly equitable sustainable society, concerned about social justice. However, the current trends of economic globalization, commanded mainly by transnational business corporations, give low priority to issues such as environmental