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Jovino Oliveira Ferreira[I,III]

Paulo César Brandão Veiga Jardim[II,III]

Maria do Rosário Gondim Peixoto[III]

Evaluation of project promoting health in adolescents

ABSTRACT

OBJECTIVE: Evaluate a program promoting exercise and healthy eating among adolescents.

METHODS: This was a cross-sectional study of 911 adolescents aged 13 to 18 years old in public schools in Goiania, Midwestern Brazil, 2010. The participants were divided into two groups: intervention (schools taking part in the Healthy Living, project) and control. The following were deemed to be exercise: displacement, physical education classes in school, physical activity outside school, and leisure-time physical activity. Pupils who totaled 300 or more minutes per week were defined as active. Consuming protective foods five or more days a week was classified as adequate intake. Statistical analyses made using the Chi-square test.

RESULTS: Most adolescents were identified as inactive or insufficiently active, 65.7% in the Intervention Group and 65.2% Control Group, showing no significant differences between groups, and with higher prevalence among girls. Slightly more than half of adolescents consumed health protective foods 5 or more days a week, 56.6% in the Intervention Group and 50.4% in the Control Group ($p = 0.373$).

CONCLUSIONS: There were no differences between schools in the Intervention Group and Control Group with regard to food choices and physical activity. This indicates that the Healthy Living project needs to be reevaluated to improve the effectiveness in achieving its objectives.

DESCRIPTORS: Adolescent. Motor Activity. Sedentary Lifestyle. Feeding Behavior. Adolescent Behavior. Health Promotion.

[I] Divisão de Atenção às Doenças Crônicas Não Transmissíveis. Diretoria de Atenção à Saúde. Secretaria Municipal de Saúde. Goiânia, GO, Brasil

[II] Departamento de Clínica Médica. Faculdade de Medicina. Universidade Federal de Goiás. Goiânia, GO, Brasil

[III] Programa de Pós-Graduação em Nutrição e Saúde. Faculdade de Nutrição. Universidade Federal de Goiás. Goiânia, GO, Brasil

Correspondence:
Jovino Oliveira Ferreira
Faculdade de Nutrição
Rua 227 Quadra 68 Setor Leste Universitário
74605-080 Goiânia, GO, Brasil
E-mail: jovino.ef@gmail.com

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INTRODUCTION

Adolescence is an important time for forming good habits and establishing autonomy, but also a time in which individuals are exposed to risk factors with both short and long-term effects on health. Among these factors are lack of exercise and unhealthy eating habits, which are associated with illnesses such as diabetes, some types of cancer and cardiovascular disease, the principle causes of mortality in adults in Brazil and other countries.[a]

In 2007 the Municipal Department of Health of Goiania, Midwestern Brazil set up the Healthy Living Project (HLP). The aim was to promote health in schools, seeking to encourage behavior leading to healthy life styles, such as doing regular exercise, choosing suitable food and giving up unhealthy practices such as smoking and consuming alcohol or drugs.[b] The HLP is run by an inter-sectoral group, made up of members from the municipal health and education departments and from the faculties of nursing, nutrition and dentistry of the *Universidade Federal de Goiás* (UFG).[4]

After carrying out a pilot study in a municipal school in 2007, the HLP was rolled out in 2008 and 2009, covering 11 educational establishments, eight of which were schools and three centers for infant education.

Educational activities on health established by the HLP included liaising with the participating schools' political--pedagogical projects, workshops conducted with partner organizations promoting health, educational events about health together with the school community (topics included exercise, diet and quality of life, among others), work experience placements for nursing, nutrition and dentistry students, qualifying HLP partners in problem--solving approaches, training teachers and community health care agents and the founding of an annual health education campaign Healthy Leisure (Lazer Saudável).[c] Although planned and by the project's inter-sectoral team, the implementation of such actions was not systematically evaluated by the educational units. According to a documental analysis of the HLP, the health sector was the most active, while the school representatives changed several times throughout the years, with no sharing of information.[4]

The objective of this study was to assess the program encouraging exercise and healthy eating choices among adolescents, comparing schools which participated in the Healthy Living project with other, non--participant schools.

METHODS

This was a transversal study of a population composed of adolescents attending state and municipal public schools, situated in areas covered by basic family health care and surrounding areas belonging to the eastern health district, in Goiania, Midwestern Brazil.

The research identified 14 public schools offering primary level education (sixth to ninth year). Eight schools participating in the HLP (intervention group) were included. Of the non-participant schools (control group), two were selected for the purposes of comparison with the HLP schools, the selection criterion being convenience due to geographical proximity. This enabled comparisons between groups of similar socio-demographic characteristics and increased the sample size, as the number of participants was greater than the calculated sample, as well as making data collection easier in terms of travelling time for the data collection teams.

In order to calculate the sample size, a population of adolescents was considered, aged 13 to 18, of both sexes and enrolled in the second stage of primary level education in one of the 14 schools studied, and the estimated prevalence of inactive and insufficiently active subjects was 58.5%,[c] with acceptable error of 3.5% and confidence interval of 95%, making a minimum sample of 563 participants. An additional 10% was added to cover losses and 20% to control for confounding variables (n = 743).

Of the total adolescents in the area in question, 1,354 belonged to the selected schools, but only 1,028 of them were found in class on the days the data were collected and subsequently invited to take part in the study. Of these 110 either declined to participate or did not meet the inclusion criteria and a further seven questionnaires were excluded for containing a large amount of contradictory information, making a final sample total of n = 911.

The data collection took place on normal teaching days during the morning, afternoon and evening, between the months of August and October, 2010. The instrument used was the National Student Health Survey (NSHS) questionnaire,[d] provided by the General Coordination for Non-Communicable Diseases and Health Problems of the Ministry Health of the Health, Monitoring Department. It is a questionnaire for the subject to

[a] Instituto Brasileiro de Geografia e Estatística (BR). IBGE Informativo para a imprensa: IBGE revela hábitos, costumes e riscos vividos pelos estudantes das capitais brasileiras. Rio de Janeiro; 2009 [cited 2010 Nov 10]. Available from: www.ibge.gov.br
[b] Secretaria Municipal de Saúde de Goiânia. Histórico do Projeto Viver Saudável. Goiânia; 2009.
[c] Instituto Brasileiro de Geografia e Estatística. IBGE Informativo para a imprensa: IBGE revela hábitos, costumes e riscos vividos pelos estudantes das capitais brasileiras. Rio de Janeiro; 2009 [cited 2010 Nov 10]. Available from: www.ibge.gov.br
[d] Ministério da Saúde. Secretaria de Vigilância em Saúde. Departamento de Análise de Situação de Saúde. Coordenação Geral de Doenças e Agravos não Transmissíveis. Pesquisa Nacional de Saúde do Escolar: questionário para coleta de dados. Brasília (DF); 2008.

Table 1. Demographic characteristics of the control and intervention groups. Goiania, Midwestern Brazil, 2010.

Variable	Total		Intervention group		Control group		p
	n	%	n	%	n	%	
Sex							
Male	492	54.0	412	53.3	80	57.9	0.310
Female	419	46.0	361	46.7	58	42.0	
Age group (years)							
13 to 14	672	74.0	575	74.3	97	70.2	0.314
15 to 18	239	26.0	198	25.6	41	29.7	
Time of study							
Day	817	89.7	694	89.7	123	89.1	0.817
Evening	94	10.3	79	10.2	15	10.8	

Intervention group: schools participating in the Healthy Living project. Control group: other schools

complete, consisting of 106 objective questions divided into ten topic blocks and two questions to be filled in by the individual collecting the data (referring to weight and height). In this study, results referring to sociodemographic aspects, diet, exercise and anthropometry (height and weight) were recorded.

A group made up of eight graduates (five in Nutrition, one in Physical Education, one in Nursing and one in Pharmacy) and one Physical Education Professional. The group received training by the person in charge of the research (physical education professional) who coordinated the data collection, the research advisor (doctor) and a collaborator (nutritionist), who all had a hand in creating the research material.

In order to identify dietary choices, the adolescents were asked on how many days, of the preceding seven, they had eaten beans, fried snacks, processed meat, legumes or cooked vegetables, cookies, candies, dried fruit or fruit salad. The foods were classified, based on NSHS guidelines, as protective (beans, milk, fruit, legumes and vegetables), indicators of a healthy diet; and non-protective (processed meat, cookies, candies and soft drinks).[e] The adolescents' dietary consumption was defined as inadequate when they consumed non-protective foods and/or consumed protective foods on four or fewer of the seven preceding days, and adequate when protective food was consumed on five or more days, meeting nutritional recommendations for promoting health and preventing and controlling non-communicable chronic illness.[7] In order to identify the frequency with which the adolescents did physical activity (PA), they were asked about four areas, referring to the preceding seven days: 1) the number of days and length of time they took to travel to and from school on foot or bicycle; 2) the number of Physical Education classes they had and the amount of time spent doing PA in them; 3) the number of days and amount of time spent doing PA (with a teacher or instructor) outside of school; 4) the number of days and amount of time spent doing PA, outside of school, without the supervision of a teacher or instructor. Based on these domains, the adolescents' PA levels were identified and those who did no type of PA or registered less than 300 minutes/week were defined as inactive or not sufficiently active respectively, whereas those who totaled 300 or more minutes/week were classed as active, according to the NSHS classification and to international recommendations.[7,16]

Weight and height were measured using gold standard techniques[8] and classified according to Body Mass Index cutoff points and reference standards established by the WHO.[f]

To carry out descriptive and analytical analysis the adolescents were stratified by sex and age group (13 to 14 and 15 to 18 years old). The analysis included demographic characterization, frequency of doing PA, dietary choices and Body Mass Index. Pearson's Chi-squared test was used in the analysis. The database and the statistical analysis were produced based on EpiInfo version 3.5.3 and Stata/SE 8.0 for Windows.

The study was approved on 9/24/2009 by the Committee for Ethics in Human and Animal Medical Research of the *Hospital das Clínicas*, *Universidade Federal de Goiás*, protocol nº 133/2009.

RESULTS

A total of 911 students were studied, 492 (54%) of whom were male and 419 (46%) female. In the

[e] Instituto Brasileiro de Geografia e Estatística. Pesquisa Nacional de Saúde do Escolar – PeNSE. Rio de Janeiro; 2009 [cited 2010 Nov 10]. Available from: www.ibge.gov.br/home/estatistica/populacao/pense/pense.pdf

[f] World Health Organization. Multicentre Growth Reference Study Group. Growth reference data for 5-19 years. Geneva; 2007 [cited 2010 Jun 4]. Available from: http://www.who.int/growthref/en/

Table 2. Comparison of levels of physical activity, dietary choices and Body Mass Index between the Intervention and Control group.[a] Goiania, Midwestern Brazil, 2010.

Variable	Total		Intervention group		Control group		p
	n	%	n	%	n	%	
Level of physical activity							
Inactive/ Not sufficiently active	598	65.6	508	65.7	90	65.2	0.909
Active	313	34.3	265	34.7	48	34.7	
Consumption of protective foods[b]							
Not consumed	279	31.7	233	31.2	46	34.5	0.373
Insufficient consumption	110	12.5	90	12.0	20	15.0	
Recommended consumption	489	55.6	422	56.6	67	50.3	
Frequency of consumption of non-protective foods[c] (days)							
Not consumed	502	55.5	429	55.9	73	53.6	0.313
1 to 4	363	40.2	309	40.2	54	39.7	
5 or more	38	4.2	29	3.7	9	6.6	
Body Mass Index							
Underweight	23	2.5	22	2.9	1	0.7	0.134
Normal weight	658	73.8	565	74.6	93	69.4	
Overweight	145	16.2	119	15.7	26	19.4	
Obese	65	7.3	51	6.7	14	10.4	

[a] Intervention group: schools participating in the Healthy Living project. Control group: other schools
[b] Healthy foods: beans, milk, fruit, legumes and vegetables
[c] Unhealthy foods: processed meat, cookies, candies and soft drinks

intervention group, 53.5% of the adolescents were male and in the control group this figure was 58%. In both groups, the majority were aged 13 to 14 and studied during the day (in the morning and afternoon, predominantly the former) (Table 1).

In both the intervention and the control group, the majority of adolescents were inactive or not sufficiently active, with no significant difference between the groups (Table 2).

In the analysis of dietary choices, it was verified that a little over half of the adolescents in the intervention and control groups had consumed protective foods on five or more of the preceding days (Table 2).

When comparing physical activity in males in the control and intervention groups, no significant difference was found, as was also the case with females. However, in the correlation between sexes there was a higher prevalence of inactive and/or not sufficiently active adolescent girls in both groups (Table 3).

With regards to the consumption of protective foods, there was no significant difference between boys in the control and intervention groups, and similar results were found for girls (Table 3).

With regards to the link between dietary choices and PA, 75 adolescents in the intervention group who represented the majority of inactive or not-sufficiently active individuals (83.3%) consumed healthy foods in quantities lower than current recommended levels ($p < 0.001$). A similar situation occurred with the control group, although without significant difference (Table 4).

DISCUSSION

In the set of variables analyzed, it was verified that no significant difference existed between the groups studied, a fact which holds much relevance for critical analysis of the intervention group, which contained those very students who were the target audience of the Live Healthy project.

Between 2007 and 2009, the HLP carried out various inter-sectoral health education activities in partnership with schools, approaching the topics of diet and exercise, although in a timely way, taking advantage of strategic dates and celebrations in the school year.[g] Although the involvement of the educational establishments had been sought, the participation of these professionals was less than had been hoped.[4]

[g] Secretaria Municipal de Saúde de Goiânia. Histórico do Projeto Viver Saudável. Goiânia; 2009.

Table 3. Comparison of levels of exercise and dietary intake for male and female pupils in the intervention and control groups.[a] Goiania, Midwestern Brazil, 2010.

Variable	Male				Female			
	Intervention		Control		Intervention		Control	
	n	%	n	%	n	%	n	%
Level of PA[b]	p = 0.473				p = 0.185			
Inactive/Not sufficiently active	224	54.3	40	50.0	284	78.6	50	86.2
Active	188	45.6	40	50.0	77	21.3	8	13.7
Time spent doing PA outside of school, with an instructor or teacher	p = 0.059				p = 0.154			
No PA outside of school with an instructor or teacher	147	42.1	19	30.1	194	63.1	42	76.3
Fewer than 300 min.	138	39.5	35	55.5	99	32.2	12	21.8
300 min. or more	64	18.3	9	14.2	14	4.5	1	1.8
Time spent doing PA outside of school, without an instructor or teacher	p = 0.973				p = 0.133			
No PA outside of school without an instructor or teacher	98	25.4	19	26.7	172	49.8	36	64.2
Fewer than 300 min.	187	48.5	34	47.8	141	40.8	16	28.5
300 min. or more	100	25.9	18	25.3	32	9.2	4	7.1
Consumption of protective foods[c]	p = 0.875				p = 0.147			
Not consumed	104	26.4	22	29.3	129	36.6	24	41.3
Insufficient consumption	59	15.0	11	14.6	31	8.8	9	15.5
Recommended consumption	230	58.5	42	56.0	192	54.5	25	43.1
Frequency of consumption of non-protective foods[d] (days)	p = 0.167				p = 0.283			
Not consumed	211	51.5	44	56.5	218	60.8	29	50.0
1 to 4	186	45.4	29	37.1	123	34.3	25	43.1
5 or more	12	2.9	5	6.4	17	4.7	4	6.9

PA: physical activity
[a] Intervention group: schools participating in the Healthy Living project. Control group: other schools
[b] Level of physical activity: sum of 4 domains (PA travelling to and from school – on foot or by bicycle, PA in school PE classes, PA outside of school with a teacher or instructor and PA outside of school without a teacher or instructor
[c] Healthy foods: beans, milk, fruit, legumes and vegetables
[d] Unhealthy foods: processed meat, cookies, candies and soft drinks

A revision of WHO[14] literature on promoting health in schools highlights programs on healthy eating and exercise which were effective in changing the young people's health. The success of those programs was attributed to changes in the school environment, which included the curriculum, intense long-term interventions and community involvement. Thus, policies and studies recommend assessing campaigns to promote health for changes and alterations they effect[h] as the evaluative process, when well disseminated, results in learning opportunities and may produce transformation in people's everyday lives, generating encouragement and consolidating health care management and teams' practices.[i]

In order to encourage regular exercise in the school community, the HLP approached promoting health through three events with differentiated emphasis: "Active Life" and "Leisure Streets" in 2007 and "Health Leisure Time" in 2009, with simultaneous activities in two public spaces in the east of Goiânia.[j] However, these campaigns did not succeed in increasing adolescents' levels of physical activity in the schools taking part in the project, as this study identified that more than 65% of the pupils, from both groups, were inactive or not sufficiently active, especially the girls. This figure is higher than that found in the 2009 National Student Health Survey, both in Goiânia and in the other Brazilian state capitals

[h] Lima VLGP, Barroso MAB, Campos NZR. Efetividade das práticas de promoção da saúde. B Tec Senac: R Educ Prof. 2009 [cited 2011 Jan 22];35(2):72-9. Available from: http://www.senac.br/BTS/352/artigo-07.pdf
[i] Sá RF, Moysés ST. O processo avaliativo em promoção de saúde como estratégia de empoderamento e de desenvolvimento de capacidades. B Tec Senac: R Educ Prof. 2009 [cited 2011 Jan 22];35(2)28-35. Available from: http://www.senac.br/BTS/352/artigo-03.pdf

Table 4. Association of dietary intake, body image and Body Mass Index with level of exercise among pupils in the intervention and control group.[a] Goiania, Midwestern Brazil, 2010.

Variable	Intervention group				Control group			
	Inactive/Not sufficiently active		Active		Inactive/Not sufficiently active		Active	
	n	%	n	%	n	%	n	%
Consumption of protective foods[b]	p = 0.001				p = 0.289			
Not consumed	162	69.5	71	30.4	31	67.3	15	32.6
Insufficient consumption	75	83.3	15	16.6	16	80.0	4	20.0
Recommended consumption	257	60.9	165	39.1	41	61.1	26	38.8
Frequency of consumption of non-protective foods[c] (days)	p = 0.270				p = 0.722			
Not consumed	281	65.5	148	34.5	47	64.3	26	35.6
1 to 4	206	66.6	103	33.3	37	68.5	17	31.4
5 or more	15	51.7	14	48.2	5	55.5	4	44.4
Body Mass Index	p = 0.500				p = 0.444			
Underweight	14	63.6	8	36.3	1	100.0	0	0.0
Normal weight	371	65.6	194	34.3	60	64.5	33	35.4
Overweight	84	70.5	35	29.4	19	73.0	7	26.9
Obese	30	58.8	21	41.1	7	50.0	7	50.0

[a] Intervention group: schools participating in the Healthy Living project. Control group: other schools
[b] Healthy foods: beans, milk, fruit, legumes and vegetables
[c] Unhealthy foods: processed meat, cookies, candies and soft drinks

and the Federal District.[j] This is a worrying state of affairs, as lack of exercise is responsible for 6% of deaths worldwide, as well as being the principal cause of illnesses such as cancer of the colon, breast cancer and heart disease.[k] In this context, schools have an important role to play in encouraging exercise in adolescents, collaborating in developing new abilities in the pupils, facilitating healthy lifestyles and behavior, and in preventing risk taking behavior,[1,11] setting the example for awareness and experience of diverse elements of body culture (sports, games, martial arts, dancing and gymnastics).

Exercise is a protective health factor and when done regularly from childhood onwards it increases the chances of a healthy adult life, acting to prevent and control chronic illness and associated risk factors, the example of the inactivity epidemic in adults.[12] In this context, exercise for young people becomes a public health priority,[3] and suggests the need to implement programs aimed at school age children and adolescents.[12]

This study showed that male adolescents, in both the intervention and control group, are more physically active than their female counterparts, which concurs with the literature which, in turn, indicates that this difference between sexes is due to socio-cultural, historic and biological elements.[3,12]

Studies recommend establishing exercise programs for adolescents, especially for girls, as they are at higher risk of being physically inactive. The proposals emphasize that the activities should be interesting, and mean something to the pupils and live up to their expectations.[12]

With regards to the topic of healthy eating, the HLP promoted the "Tasty Living" and "Health Leisure" events in 2007 and 2009 respectively in the school community[l] and the work experience placements as part of *Universidade Federal de Goiás* health care courses between 2007 and 2010.[4] However, this study's findings reveal that in the two groups studied approximately half of the adolescents consumed healthy food, results similar to those of the NSHS,[m,n] and suggesting, based on this fact, that the Healthy Living project did not yield

[j] Instituto Brasileiro de Geografia e Estatística. IBGE Informativo para a imprensa: IBGE revela hábitos, costumes e riscos vividos pelos estudantes das capitais brasileiras. Rio de Janeiro; 2009 [cited 2011 Jan 22]. Available from: www.ibge.gov.br
[k] Organización Mundial de la Salud. 10 datos sobre la actividad física. Geneva; 2010 [cited 2011 Feb 8]. Available from: http://www.who.int/features/factfiles/physical_activity/es/index.html
[l] Secretaria Municipal de Saúde de Goiânia. Histórico do Projeto Viver Saudável. Goiânia; 2009.
[m] Instituto Brasileiro de Geografia e Estatística. IBGE Informativo para a imprensa: IBGE revela hábitos, costumes e riscos vividos pelos estudantes das capitais brasileiras. Rio de Janeiro; 2009 [cited 2011 Jan 27]. Available from: www.ibge.gov.br
[n] Instituto Brasileiro de Geografia e Estatística. Pesquisa Nacional de Saúde do Escolar – PeNSE. Rio de Janeiro; 2009 [cited 2011 Jan 27]. Available from: www.ibge.gov.br/home/estatistica/populacao/pense/pense.pdf

any benefits with regards to dietary choices. Studies and investigations recommend investing in children and adolescent's eating habits because, as with physical activity, healthy eating is a protective factor against various non-communicable chronic illnesses, among them cardiovascular illness. School meals, therefore, should be an important tool in acquiring healthy eating habits,[16] as recommended by studies, legislation and current public policies.[7,10,o] In that case, the HLP needs to assess its own influence on the availability of healthy foods in the school and the home.

In the link between healthy eating and the level of physical activity, again, no significant differences were found between the intervention and control groups, suggesting the need to encourage consumption of protective foods, as well as doing at least 300 minutes of physical activity per week, for all adolescents.

Activities which promote health are important for creating healthy and sustainable lifelong habits. It is possible to produce positive impacts within the school, building self-esteem, and healthy habits and behavior in all members of the school community.[1,2,11]

This study identified both underweight and overweight, including obese, students in the intervention and the control group. Interventions are recommended to prevent these nutritional problems progressing, and the school is an appropriate place for these actions.[5,13]

Similar to previous comparisons, the food choices of the adolescents in the intervention group were no different to those of the control group, thus, both groups need educational interventions in health. This result shows that the HLP had no influence on students' health choices. Therefore, it was deemed necessary to assess the determinants of being physically inactive and not eating healthily, together with school communities considering, among the various factors, school meals, the availability of safe public spaces in which to exercise, the teachers' training and the way in which these topics are approached in the school.[12]

Several studies recommend establishing campaigns to promote healthy habits and changes in behavior in pupils, and others emphasize the importance of educating this population on the risk factors for chronic non-communicable illness and measures for avoiding these illnesses.[1,6,11,15]

The PVS sought to promote permanent educational campaigns for teachers and health care professionals, and events promoting health in the partner school communities approaching topics concerned with healthy habits and citizenship through active methodologies.[4] However, studies show that merely establishing policies does not promote change, the dimension of the choices needs to be taken into account, in the case of diet, as well as the use of qualitative strategies, to redeem concepts, beliefs and individual and group behavior.[15] In this study, the fact that the research instrument used only indicated aspects related to the participants' lifestyle, without considering the socioeconomic and cultural context; it did not include a comprehensive assessment of dietary and nutritional intake; determinants of lack of physical activity and unhealthy diet were not assessed. Nor was any previous assessment of the participants carried out. To investigate the promotion of health, a variety of methodological approaches are necessary, including the results and evaluations of quantitative and qualitative processes.[9,14]

To conclude, it was observed that in identifying the frequency with which the subjects exercised and their dietary choices, this study revealed that both groups of pupils studied had high levels of exposure to health risks, higher than those found for Goiânia in the most recent national survey, with regards to lack of physical activity and unhealthy eating.

The PVS needs to be re-evaluated to better view its effectiveness in reaching its objectives, including new methods of assessment and monitoring. Moreover, together with new quantitative and qualitative studies, it is urgently recommended that interventions and investment by the authorities involved in health, education, sport and leisure take place, in the sense of encouraging changes in young people's lifestyles, so as to be in line with current national and international public health policies.

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[o] Ministério da Saúde; Organização Pan-Americana da Saúde. Escolas promotoras de saúde: experiências do Brasil. Brasília (DF); 2006 [cited 2011 Jan 31]. Available from: http://portal.saude.gov.br/portal/arquivos/pdf/ esc_prom_saude.pdf

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