HHS Public Access

Author manuscript

Patient Educ Couns. Author manuscript; available in PMC 2017 October 01.

Published in final edited form as:

Patient Educ Couns. 2016 October ; 99(10): 1657–1662. doi:10.1016/j.pec.2016.04.010.

Improving the Understanding of Schistosomiasis among Adolescents in Endemic Areas in Brazil: a Comparison of Educational Methods

Maria Flávia Gazzinelli[a,c], **Lucas Lobato**[a], **Gisele Andrade**[a], **Leonardo Ferreira Matoso**[b,c], **David J. Diemert**[d], and **Andréa Gazzinelli**[a,c,*]

[a]School of Nursing-Federal University of Minas Gerais, Belo Horizonte, Minas Gerais, Brazil

[b]Research Center René Rachou – FIOCRUZ-MINAS. Belo Horizonte, MG, Brazil

[c]National Institute of Science and Technology in Tropical Diseases. Brazil

[d]Research Center for Neglected Diseases of Poverty, School of Medicine and Health Sciences, George Washington University, Washington, DC, USA

Abstract

Objective—To evaluate the effectiveness of two teaching strategies, both guided by the concept of dialogicity, on adolescents' knowledge about schistosomiasis and adherence to diagnostic fecal testing.

Methods—Two teaching strategies related to schistosomiasis were developed, an educational video and group conversation, which were tested in two groups of students aged 10–15 years old. Before and after the intervention, a questionnaire was applied to assess participants' knowledge about schistosomiasis and, after the intervention, two fecal samples were requested from each participant. Comparisons were performed by paired t- and McNemar tests.

Results—Both strategies resulted in statistically significant improvements in knowledge between the pre- and post-tests. Students who watched the video had a higher return rate of fecal samples and percentage of correct questionnaire answers, mainly on questions about schistosomiasis infection.

Conclusion—teaching strategies based on dialogue favored the construction of concepts about schistosomiasis that can influence the adoption of positives attitudes related to health.

Practical Implications—Using teaching strategies based on the concept of dialogicity can favor the increase of knowledge of school age children about schistosomiasis and can influence behavioral change related to health.

*Corresponding author: School of Nursing, Federal University of Minas Gerais, Av. Alfredo Balena 190, Belo Horizonte, MG, Brasil, 30.130-100. Tel: +55 31 3409.9863. andreag@ufmg.br (Andréa Gazzinelli).

Conflict of interest

The authors have no conflict of interest to disclose.

Keywords

Teaching Strategies; Schistosomiasis; Health Education; School Age Children

1. Introduction

Schistosomiasis is one of the greatest challenges to global public health, due to its high burden of disease and wide geographical distribution [1,2]. Although it is rarely fatal, its effects are not negligible for those who are infected and who live in endemic areas where re-infection occurs frequently following treatment. The chronic nature of schistosomiasis has an enormous impact on the quality of life of affected individuals, fueling a vicious cycle of infection, poverty, low productivity and inadequate socioeconomic development [3,4].

It is estimated that people living in endemic regions remain infected for a third to half of their lives, often without showing symptoms of advanced morbidity related to this disease such as liver fibrosis and hepatosplenomegaly [5]. In fact, the negative impact of schistosomiasis on health is frequently due to non-specific manifestations such as anemia, malnutrition, exercise intolerance and learning impairments [1,4].

For the control of schistosomiasis, multi-sectoral actions that involve treatment, health education, sanitation and supply of safe water are needed [6]. Among these interventions, health education can serve as a powerful tool for infection control. Besides the low cost associated with its implementation, this strategy is able to achieve significant and lasting results in the control of intestinal parasites [7,8] especially when the social representations of population groups are considered, as well as their pre-existing knowledge and social practices [9]. It is well known that when educational methods are used that avoid reducing the process to the transmission and reception of information, which implies a hierarchical structure, the likelihood of success is greater [10,11]. In the context of schistosomiasis, health education strategies have been linked to reductions in prevalence of infection, improvements in adherence to treatment, and in knowledge of prevention practices [12,13].

Historically, educational interventions used for the prevention of schistosomiasis have, in most cases, been structured according to a traditional model of education [11,14]. However, when the individual's experience and the meanings he attributes to the disease are not considered, this model is not capable of stimulating the development of new concepts or changing attitudes toward the disease.

In schools, educational interventions are mostly limited to providing information about the schistosomiasis life cycle and modes of transmission through textbooks, pamphlets and informational brochures in which the social determinants of disease are not considered [15]. Educational strategies such as these that rely on recognition must be modified in the school setting into strategies that favor problematization, especially when one considers that the highest prevalence of *Schistosoma* infection is found in school-age children [16]. It is well known that health education, if well planned in terms of methodology, can mediate the construction and (re)building of concepts, the adoption of attitudes and the strengthening of citizenship, thereby becoming a useful and effective instrument for realizing public policies.

With this in mind, a proposal for health education about schistosomiasis was developed for use in endemic communities in the Jequitinhonha Valley of the state of Minas Gerais in Brazil. This consisted of educational interventions that incorporate topics related to the transmission of schistosomiasis, the symptoms of the disease, prevention measures and the correct collection of fecal samples for the diagnosis of this parasitic disease. The goal of this health education proposal was to prepare children for making a decision to participate in a research project, besides increasing knowledge about the disease. By accepting to participate in this research project, children and adolescents – potential research volunteers – would have to undergo the collection of fecal and blood samples, and treatment in case of re-infection over the three-year period of the project.

To develop the health education intervention, educational strategies based on problematization and dialogicity were selected. Extensive prior research has demonstrated the limitations of traditional health education programs, in which learning is accomplished by the objective assimilation of content [17]. Furthermore, there is still little evidence to enable discussion of the effects of alternative teaching strategies [18]. It is assumed that educational programs that incorporate a dialogical perspective are opposed to those based on a traditional educational perspective. The question to be answered is whether there are strategies based on a dialogical perspective that would be more appropriate and effective than others in terms of promoting learning and improving adherence to diagnosis testing in the context of schistosomiasis. Therefore, the study described herein aimed to evaluate the effectiveness of two different educational strategies – both based on the concept of dialogicity – in increasing the knowledge of adolescents about schistosomiasis and their adherence to the fecal test for diagnosing this infection.

2. Methods

This study was conducted as part of a larger ongoing research project entitled, "Resistance induction model for treatment of schistosomiasis in endemic areas", developed by the Research Center René Rachou/FIOCRUZ-MINAS, the School of Nursing at the Federal University of Minas Gerais and The George Washington University, USA. The overall objective of this research project is to identify individuals between the ages of 5 and 15 years who, after treatment, develop resistance to *S. mansoni* infection.

2.1 Study design

This was a randomized, quasi-experimental study that evaluated the knowledge of school-age children about schistosomiasis before and after two dialogical educational interventions, Conversation Group (CG) and Video Animation (VA) methods, as well as their adherence to fecal testing for diagnosis of infection These strategies were tested in two school groups. Prior to the intervention, a pre-test was applied to the participants of the two groups using a structured questionnaire. One week after the intervention, the same questionnaire was applied again and containers for collecting fecal samples were distributed. Participants were asked to return two fecal samples to the study team within 5 days of distributing the containers.

2.2 Study site and population

This study was conducted in adolescents aged 10 to 15 years from two public schools located in the urban seat of the municipality of Ponto dos Volantes, in the Jequitinhonha Valley, northeast region of the Brazilian state of Minas Gerais. Ponto dos Volantes is an area that is endemic for infection with *S. mansoni*, with 11,345 inhabitants, 69% of whom live in rural areas. The region is considered one of the poorest in the country, having a Human Development Index (HDI) in the medium-low range (0.595) and a Poverty Index (58.42%) that is one of the highest in the state [19].

The two schools together have approximately 1,200 students, of whom 660 are in the 10–15 year old age. The required sample size for the educational intervention study was calculated using the standard deviation taken from a previous study conducted in the same area [20], given the similarities in methodology, subject matter, region and variables measured with the current study. The calculation was performed accounting for paired samples, based on the parameters $\alpha = 5\%$ and $\beta = 10\%$ [21] with an assumed standard deviation of 12.1% and a minimum difference between the pairs of 7.7% (referring to the percentage responding correctly to a question). An additional 25% individuals were included in the sample due to possible losses to follow-up and refusals to participate. Therefore, the sample size was 72 students that were randomly divided into two groups (CG and VA), with 36 participants in each. Only one student from the CG group did not answer the post-test and was, therefore, excluded from the study. The final sample was 71 adolescents, 36 in the VA group and 35 in the CG group.

2.3 Educational interventions

Consented adolescents were randomized at both of the schools into the CG or VA intervention groups. Both interventions were conducted simultaneously at each school. The CG and VA educational strategies used in the study are characterized by the appreciation of the role of language in the social construction of knowledge. Exemplified by the theoretical framework of Vygotsky, such strategies consider semiotic mediation one of the central facets of the construction of knowledge.

The CG intervention in this study consisted of creating a space to promote dialogue between the teenagers. It was facilitated by an experienced educational researcher and a trained graduate student. Thirty-five teenagers participated in this 50 minutes activity and were divided into 5 groups of 7 participants each. Students were organized into a circle and invited to talk about themselves, their ways of life, the place where they live and about their knowledge of schistosomiasis and of research. Based on what students said the researchers addressed knowledge about schistosomiasis and the research. The CG is a strategy to mediate group processes and to motivate the construction of autonomy through problematization and the socialization of knowledge geared toward action. It includes a range of exchanges of experiences, conversations, discussion and dissemination of knowledge among the different social actors, linking culture and subjectivity.

The VA intervention consisted of an 8-minute video of an animated cartoon that highlighted the characteristics of the Jequitinhonha Valley and provided information about the

schistosomiasis life cycle (LINK TO VIDEO). Starring two teenage characters, the video was characterized, like the CG group, by the establishment of the confrontation between two different rationales: elaborated and common knowledges, creating possibilities for the reinvention of common sense [22]. Entitled, "A very strange subject: schistosomiasis," the video had as its starting point, social representations about the disease that had been identified from a previous study [23]. It was based on the idea that, through language and stimulation of diverse and articulated discourses and content, the video could enable the creation of a network of meaningful relationships that might allow the adolescents to reconstruct knowledge and produce new meanings of the disease, of the place where they live, of the relationship they establish with it, and of research.

Figure 1 shows a scene from the animated video that is full of potent images designed to affect adolescents. They include aspects related to their habits and customs, as well as features of the nature and vegetation of the region. In this scene the mode of infection with schistosomiasis is shown, with emphasis on the biological, social and cultural aspects associated with the disease. Figure 2 depicts the moment in the video in which one of the characters, a teenager, elaborates the concepts related to the method for diagnosing schistosomiasis, alluding to a research investigation. After viewing the video, the researcher discussed the issues shown with the participants. The duration of the VA intervention was approximately 50 minutes.

In relation to schistosomiasis, both the CG and the AV discussed possible symptoms of the disease, the possibility of asymptomatic infection, the modes of transmission of *S. mansoni*, ways to prevent and reduce the prevalence, and the methods used to diagnosis.

2.4 Evaluation of compliance with fecal examinations

After the educational intervention and the post-test, two containers for the collection of feces were given to each participant, the second delivered only after the return of the first. Adherence was assessed by the return of the two samples within 5 days of distribution of the containers.

2.5 Assessment of knowledge

A structured questionnaire with open- and close-ended questions about participants' knowledge of schistosomiasis was developed and implemented before and after the educational intervention. The questionnaire was pre-tested for suitability and addressed aspects related to the symptoms of the disease or the absence of them, as well as modes of prevention and transmission. The selection of these topics was based on previous studies [20,23], besides the relevance of these topics in the context of schistosomiasis. The questionnaire application lasted on average 10 minutes and was conducted at the schools in unoccupied rooms, without the interference of third parties or any noise that could compromise the collection of data or divert the participants’ attention.

2.6 Statistical analysis

To ensure reliability, independent double data entry was performed using the Social Package Social Sciences program version 21 (SPSS). Descriptive analysis was performed by

calculating relative and absolute frequencies. We evaluated the effect of the interventions on knowledge of schistosomiasis by comparing the pre- and post-tests using the McNemar and paired t-tests. For the evaluation of knowledge the number of correct answers was summed and divided by the total number of questions. The significance test for assessing differences in proportions was used to compare the two groups, assuming a normal distribution. A significance level of 5% was used for all tests and, in the case of parametric tests, the assumption of normality of the data was confirmed by the Kolmogorov-Smirnov test. The chi-square test was used to compare compliance with the return of the containers of fecal samples between groups.

2.7 Ethical considerations

The study was approved by the Brazilian National Committee for Research Ethics (No. 531.282), in accordance with the provisions of the Ministry of Health Resolution 466/12, which regulates research involving human subjects. All participants and their parents or guardians provided written, informed consent.

3. Results

Of the 71 participants who were evaluated, 42 (56%) were male and 38 (53.5%) were students at the Municipal School, whereas the remainders were enrolled in the State School. The average age of the study sample was 12.08 years (SD =1.7), ranging between 10 and 15 years. In the VA group, 20 (55.5%) were male with a mean age of 12.1 years, while in the CG group the number of male participants was 22 (62.8%) and the average age was also 12.1 years. There was no statistically significant difference between these groups for either sex (chi-square test, $p = 0.823$) or age (Mann-Whitney test, $p = 0.923$). There were no statistically significant differences between the baseline knowledge of the participants of the two groups as determined by the pre-test and evaluated by the chi-square and t tests.

Table 1 details the percentage of correct answers from adolescents in both the CG and VA groups on questions dealing with symptoms, modes of transmission and prevention, diagnosis and means of reducing schistosomiasis prevalence. It is observed that, when comparing the results of the pre- and post-tests, students who participated in the educational intervention with the animated video showed significant improvement in answering correctly to a greater number of questions (8 questions) than the group of adolescents in the conversation group (4 questions).

Following the intervention, in the CC group there was a significant increase in the number of correct answers related to disease transmission, more specifically about the impossibility of transmission through contact with soil (Table 1). Also, there was an increase in the number of correct answers related to the diagnosis of schistosomiasis being done by fecal examination and the inadequacy of a blood test for this purpose. Susceptibility to reinfection after drug treatment was another issue for which there was a significant increase in the percentage of correct answers.

In the VA group, in addition to observing a greater overall increase in correct responses, there was a significant improvement in knowledge about the possibility of asymptomatic

disease in individuals living in endemic areas, the inability to see parasite eggs in the stool with the naked eye, the characterization of the disease as fatal and transmission through contact with water. It is noteworthy, however, that in both groups, there was no significant increase in the number of correct answers related to the idea that infection can occur through contact with apparently clean water, although both groups had a high percentage of correct answers pre-intervention on this question.

Table 2 shows the percentage of correct responses of participants on the strategies used to prevent infection. On the pre-test, most students in both the CG and the VA groups did not know the preventive measures that should be taken in their community (71.4% and 72.3%, respectively). After the interventions, most participants in both groups were able to report at least one effective strategy to prevent schistosomiasis, especially the importance of avoiding swimming in streams and/or contact with contaminated water.

Both intervention groups had a statistically significant improvement in the mean percentage of correct answers between the pre-test and post-test when considering all questions on the questionnaire (Table 3). It is noteworthy that in the post-test, in both groups, the average participants' understanding of the infection was more than 80%, and the biggest increase in knowledge was observed in students who participated in the Video Animation (32.69%, $p<0.001$). However, there was no statistically significant difference between the two groups in terms of the increase in understanding (Table 3).

Regarding compliance with the return of fecal samples for parasitological examination, it was observed that in the VA group, a greater number of participants (88%) delivered the two containers of feces when compared to the CG group (68%, $p = 0.036$) (Table 4).

4. Discussion and Conclusion

4.1 Discussion

The results of this study demonstrate that the Conversation Group and Video Animation teaching strategies favor the learning of concepts related to infection with *S. mansoni*, especially about the causes, modes of infection, symptoms and diagnosis of this parasitic infection. The positive results obtained can be attributed to the characteristic of dialogicity found in both educational interventions. The dialogical method rejects the imposition of scientific knowledge, and instead, enables the joint construction of knowledge. The language of imagery is a unique attribute of the animated video, whereas the possibility of speaking and listening is the principal feature of the conversation group. Because it contains a narrative, the video provides the projection of the students themselves onto the life stories of the characters, with emphasis on the pedagogical implications of this action. To allow the possibility of the mutual construction of ideas, the conversation group technique facilitates the exercise of argument – a condition for exercising the political dimension of human action. Although these strategies have different characteristics, both offer the possibility of dialogue between the participants about the different types of knowledge, besides allowing different ways for constructing meaning and producing subjectification. Similar results were obtained in a study conducted in India that used the dialogical method to improve health concepts of adolescents [25].

Although both of the educational strategies that were tested had positive results, the Video Animation had superior effects when compared with the Conversation Group in terms of compliance with returning the fecal samples for parasitological testing. Even though the CG is conducive to interaction, encouraging the free and open expression of thoughts, in our study the VA was a more effective strategy for facilitating compliance with returning the stool samples. The video that was shown was specifically made for the study; it contained an aesthetic narrative that was woven from characteristic images, sights, and sounds of the Jequitinhonha Valley that were familiar to the study participants.

For this reason, the video could have been interpreted as an invitation to consider new ways of looking at and acting on the issue being presented, favoring compliance with the stool exams. Through their dimension of otherness, aesthetic productions such as these can trigger experiences of estrangement and questioning in the individual that occur at the level of emotions. In this sense, it can be said that the aspect of recognition, present in the majority of current teaching strategies, through this intervention gave way to the experience of invention, [25] which has the property of interrupting the usual cognitive flow.

International studies that have evaluated the impact of health education on knowledge and attitudes related to schistosomiasis have shown that education through the use of video among children and adolescents, and through dialogue with adults, improves the knowledge of participants about this disease and is also able to reduce risk behaviors for infection, promote adherence to treatment and to undergoing fecal testing for diagnosis of schistosomiasis, as well as reduce the prevalence of disease and parasite burden in endemic areas [12,13].

However, it is important to be aware that video interventions should be used with care in educational programs, avoiding the use of technology simply for technology's sake. Instead, this tool should be used not only as a communication resource or as a teaching tool to illustrate educational content, but also as a device with the potential to focus on the processes of subjective production.

It is important to highlight that health education is important for maintaining and consolidating the success of schistosomiasis control programs [26]. However, health educational strategies must be accompanied by social, environmental and health interventions in areas that are endemic for schistosomiasis. Even if there is a greater awareness of the population about the risks of infection, people will continue to use untreated and potentially contaminated water sources if there are no alternatives available for recreation, sanitation and treated water. In this regard, we reiterate the recommendations of the World Health Organization, for promoting intersectorial actions for schistosomiasis control according to which health education promotion activities should be accompanied by the implementation of improved sanitation and supply of clean water [27].

It is important to draw attention, however, to the fact that the success of educational interventions is related to the timing of their implementation, and requires application over the long term with the use of continuing education strategies and periodic reviews of the intervention [13]. Furthermore, the development of health education activities in disease

endemic areas must be integrated between educational institutions and the community. It is well known that in endemic areas, schools are the main sources of information about schistosomiasis, and are identified by the population as places for learning about the prevention of this disease. The school, therefore, is viewed as a legitimate social institution by the population. In addition to instructing students about strategies for preventing the disease, these institutions can empower them to disseminate this information to their homes and consequently to the community at large.

A study design consisting of an assessment that is applied pre and post-intervention, without a control group, has limitations. The decision to perform it in this manner was based on the ethical imperative to include all participants in educational activities. In addition, it is recommended that for experimental studies in which there is a control group, the experimental and control groups should be located at distant sites from each other, since otherwise participants in the different groups might communicate about the interventions, leading to the possibly of an interference effect. However, in our study, given the large area in which it was performed and the difficulty of transportation between communities, it was not logistically feasible to conduct the educational activities with two groups located in distant communities.

4.2 Conclusion

Teaching strategies guided by the concept of dialogicity can favor the increase of knowledge of school age children about schistosomiasis. The positive impact that was observed with the video and the conversation group shows that these strategies have the potential to improve understanding of schistosomiasis and research and should be used in disease control programs. In addition, the positive contribution of the video in promoting compliance with the diagnostic exam also draws attention to the need to use of different educational strategies in specific settings, considering the various contexts, target populations, specific content and approaches, among other factors.

4.3 Practical Implications

Children who participate in health research projects need to understand the process and the disease to aid them in making an informed decision to participate in the research. Usually, increasing knowledge about disease, means of transmission and prevention can stimulate behavioral change in control programs of neglected tropical diseases. Furthermore, the knowledge that symptoms can be nonspecific, can improve the seeking and utilization of healthcare services and early treatment, thereby improving the control of schistosomiasis.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

Financial Support

Tropical Medicine Research Center, National Institutes of Health–TMRC-NIH, USA, (Number 1P50AI098507-01), Fundação de Amparo à Pesquisa de Minas Gerais-FAPEMIG, Conselho Nacional de Desenvolvimento Científico e Tecnológico-CNPq.

We would like to thank the adolescents who voluntarily decided to participate in this study, as well as their parents.

References

1. Lustigman S, Prichard RK, Gazzinelli A, Grant WN, Boatin Ba, McCarthy JS, et al. A research agenda for helminth diseases of humans: The problem of helminthiases. PLoS Negl Trop Dis. 2012; 6:e1582. [PubMed: 22545164]
2. Steinmann P, Keiser J, Bos R, Tanner M, Utzinger J. Schistosomiasis and water resources development: systematic review, meta-analysis, and estimates of people at risk. Lancet. 2006; 6:411–425. [PubMed: 16790382]
3. King CH, Dangerfield-Cha M. The unacknowledged impact of chronic schistosomiasis. Chronic Illn. 2008; 4:65–79. [PubMed: 18322031]
4. King CH, Dickman K, Tisch DJ. Reassessment of the cost of chronic helmintic infection: A meta-analysis of disability-related outcomes in endemic schistosomiasis. Lancet. 2005; 365:1561–1569. [PubMed: 15866310]
5. King CH, Olbrych SK, Soon M, Singer ME, Carter J, Colley DG. Utility of repeated praziquantel dosing in the treatment of schistosomiasis in high-risk communities in Africa: A systematic review. PLoS Negl Trop Dis. 2011; 5
6. Bruun B, Aagaard-Hansen J, Watts S. The social context of schistosomiasis and its control An introduction and annotated bibliography. Strategies. 2008; 227
7. Phiri K, Whitty CJ, Graham SM, Ssembatya-Lule G. Urban/rural differences in prevalence and risk factors for intestinal helminth infection in southern Malawi. Ann Trop Med Parasitol. 2000; 94:381–387. [PubMed: 10945048]
8. Ferreira GR, Salgueirosa Andrade CF. Some socioeconomic aspects related to intestinal parasitosis and evaluation of an educational intervention in scholars from Estiva Gerbi, SP. Rev Soc Bras Med Trop. 2005; 38:402–405. [PubMed: 16172756]
9. Toscani NV, Santos a JDS, De Silva LLMD, Tonial CT, Chazan M, Wiebbelling a MP, et al. Development and analysis of an educational game for children aiming prevention of parasitological diseases. Interface Commun Heal Educ. 2007; 11:281–294.
10. C G, DL R, ZMB H. differentiated in educational practice procedures in teaching and learning parasitology. Ensino, Saúde e Ambiente. 2013; 6:89–100.
11. Rozemberg B. Local knowledge and dilemmas related to validity and applicability of scientific knowledge in rural areas. Cad Saude Publica. 2007; 23:S97–S105. [PubMed: 17308723]
12. Hu G-H, Hu J, Song K-Y, Lin D-D, Zhang J, Cao C-L, et al. The role of health education and health promotion in the control of schistosomiasis: experiences from a 12-year intervention study in the Poyang Lake area. Acta Trop. 2005; 96:232–241. [PubMed: 16154103]
13. Zhou LY, Deng Y, Steinmann P, Yang K. The effects of health education on schistosomiasis japonica prevalence and relevant knowledge in the People's Republic of China: A systematic review and meta-analysis. Parasitol Int. 2013; 62:150–156. [PubMed: 23201566]
14. Gazzinelli MF, Gazzinelli A, Santos RV, Gonçalves LAO. The interdiction of disease: a cultural construction of schistosomiasis in an endemic area in Minas Gerais, Brazil. Cad Saude Publica. 2002; 18:1629–1638. [PubMed: 12488890]
15. Sousa MRC. Schistosomiasis in Brazil: teaching versus education. Rev Bras Educ Med. 2009; 33:144–147.
16. Colley DG, Bustinduy aL, Secor WE, King CH. Human schistosomiasis. Lancet. 2014; 383:2253–2264. [PubMed: 24698483]
17. Abrahão AL, Merhy EE. Healthcare training and micropolitics: concept tools in teaching practices. Interface - Comun Saúde, Educ. 2014; 18:313–324.
18. LK, G. Dissertation. Belo Horizonte - Brazil: Nursing School Federal University Minas Gerais; 2011. Educational practices in primary care: a case study of teaching methods.

19. IBGE. Censo 2010 - [Brazilian Institute of Geography and Statistics]. 2010
20. Gazzinelli MF, de Souza V, de Araújo LHL, Costa RDM, Soares AN, Maia CPC. Theater in the education of children and teenagers participating in a clinical trial. Rev Saude Publica. 2012; 46:999–1006. [PubMed: 23503538]
21. Miot HA. Sample size in clinical and experimental trials. J Vasc Bras. 2011; 10:275–278.
22. Santos, BDS. The critique of lazy reason: against the waste of experience. Cortez: São Paulo; 2009.
23. Gazzinelli MF, Lobato L, Matoso L, Avila R, de Cassia Marques R, Brown AS, et al. Health education through analogies: Preparation of a community for clinical trials of a vaccine against hookworm in an endemic Area of Brazil. PLoS Negl Trop Dis. 2010; 4:e749. [PubMed: 20651933]
24. Mohajer N, Earnest J. The challenge of low literacy in health promotion: Using empowerment methods with out-of-school adolescents in North India. Vulnerable Children and Youth Studies. 2010; 5.1:88–96.
25. Kastrup V. Invention on fingertips: attention reversion in visually impaired people. Psicol em Rev. 2007; 13:69–90.
26. Guo JG, Cao CL, Hu GH, Han L, Dong L, Rong Z, et al. The role of “passive chemotherapy” plus health education for schistosomiasis control in China during maintenance and consolidation phase. Acta Trop. 2005; 96:177–183. [PubMed: 16112637]
27. WHO. World Heal Organ; 1998. Guidelines for the Evaluation of Soil-transmitted Helminthiasis and Schistosomiasis at Community Level.

Highlights

- The effectiveness of two teaching strategies for health education were evaluated.
- Knowledge about schistosomiasis and adherence to diagnostic testing were evaluated.
- Both strategies based on dialogicity increased knowledge about schistosomiasis.
- Strategies based on dialogicity favored teens positives attitudes towards health.
- The Video Animation strategy was more effective in adolecents' adherence to diagnostic fecal testing.

Fig. 1.
Image from the animated video, "A very strange subject: Schistosomiasis," that was created by the researchers. This figure depicts a scene of the video that addresses the mode of transmission of the infection.

Fig. 2.

Image from the animated video, "A very strange subject: Schistosomiasis." This figure depicts a scene showing a teenager developing knowledge about the method used to diagnose schistosomiasis, represented as an investigation.

Table 1

Responses to questions about schistosomiasis in pre- and post-tests in the Conversation Group and Video Animation.

Questions	Number (%) Correct Answers		p^a
	Pre-test	Post-test	
Conversation Group (n = 35)			
Absence of symptoms	23 (65.7%)	31 (88.6%)	0.210
Impossibility of visualizing eggs in the stool	24 (68.6%)	32 (86.5%)	0.210
Impossibility of infection through contact with dirt	7 (20.0%)	24 (68.6%)	**0.001**
Infection through contact with stagnant water	26 (74.3%)	31 (81.6%)	0.267
Infection through contact with apparently clean water that receives sewage	30 (85.7%)	31 (88.6%)	1.000
Fatal disease	21 (60.0%)	26 (74.3%)	0.302
Impossibility of diagnosis through blood exams	5 (14.4%)	28 (77.8%)	**0.035**
Fecal exams essential for diagnosis	29 (82.9%)	35 (100%)	**0.031**
Reinfection possible after treatment	26(74.2%)	33 (94.3%)	**0.016**
High prevalence of schistosomiasis in the community	23 (65.7%)	29 (81.7%)	0.070
Higher vulnerability to infection in Ponto dos Volantes compared to the state capital, Belo Horizonte[b]	16 (43.2%)	22 (62.9%)	0.650
Video Animation Group (n = 36)			
Absence of symptoms	16 (44.4%)	31 (86.1%)	**0.001**
Impossibility of visualizing the eggs in the stool	25 (69.4%)	33 (91.7%)	**0.021**
Impossibility of infection through contact with dirt	7 (19.4%)	19 (52.8%)	**0.004**
Infection through contact with stagnant water	25 (69.3%)	33 (91.7%)	**0.008**
Infection through contact with apparently clean water that receives sewage	33 (91.7%)	33 (91.7%)	1.000
Fatal disease	24 (66.7%)	35 (97.3%)	**0.001**
Impossibility of diagnosis through blood exams	4 (11.4%)	28 (40.0%)	**0.001**
Fecal exams essential for diagnosis	29 (80.6%)	36 (100%)	**0.016**
Reinfection possible after treatment	28 (77.8%)	35 (97.3%)	**0.016**
High prevalence of schistosomiasis in the community	26 (77.2%)	29 (80.6%)	0.581
Higher vulnerability to infection in Ponto dos Volantes compared to the state capital, Belo Horizonte[b]	19 (52.8%)	23 (63.9%)	0.454

Note:

[a] McNemar Test

[b] Non-endemic, large urban center of the state of Minas Gerais

Table 2

Responses to questions about methods of preventing schistosomiasis on the pre and post-tests in the CG and VA groups.

Group	Answers	Number of Correct Answers – n (%)	
		Pre-test	Post-test
Conversation Group (n = 35)	Do not swim in streams	2 (5.7)	9 (25.0)
	Treat infected individuals	8 (22.9)	7 (20.0)
	Do not defecate close to streams	0	1 (2.9)
	Build latrines	0	4 (11.4)
	Do not know	25 (71.4)	14 (44.9)
Video Animation (n=36)	Do not swim in streams	4 (11.1)	10 (27.8)
	Treat infected individuals	3 (8.3)	5 (13.9)
	Do not defecate close to streams	0	2 (5.6)
	Build latrines	3 (8.3)	5 (13.9)
	Do not know	31 (72.3)	14 (38.9)

Table 3

Percentage of correct answers about schistosomiasis in the pre and post-tests in the CG and VA groups.

Group	% Correct		SE[a]	CI[b]	p[d]	t[c]
	Pre-test	Post-test				
Conversation Group	51.64	81.09	3.73	(21.85 – 37.04)	<0.001	0.522
Video Animation	50.64	83.33	3.44	(25.69 – 39.68)	<0.001	

Note:

[a]SE=Standard Error;

[b]CI=Confidence Interval;

[c]Test for Difference Between Two Population Proportion between two groups;

[d]Paired t-test

Table 4

Participants who returned two fecal samples for parasitological examination in the CG and VA groups

Type of intervention	Participants Returning Samples					x^2	*p*
	Yes		No				
	n	%	n	%	Total		
Video Animation	32	88	4	12	36		
Conversation Group	24	68	11	32	35	0.439	0.036

x^2: Chi-square test