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Improving the understanding of schistosomiasis among adolescents in endemic areas in Brazil: A comparison of educational methods

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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.

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

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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 diagnostic 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 René Rachou Research Center/FIOCRUZ-MINAS, School of Nursing at the Federal University of Minas Gerais, George Washington University, USA and University of Texas Health Sciences Center, San Antonio, USA. The overall objective of this research project is to identify individuals between the ages of 6 and 15 years who, after treatment, develop resistance to *Schistosoma 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- the 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 10–15 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 *Schistosoma 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 1200 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 min 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.