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KNOWLEDGE OF ADOLESCENTS ABOUT LEPROSY AFTER EDUCATIONAL INTERVENTION

CONHECIMENTO DE ADOLESCENTES SOBRE HANSENÍASE APÓS INTERVENÇÃO EDUCATIVA

EL CONOCIMIENTO DE LOS ADOLESCENTES SOBRE LA LEPRA DESPUÉS DE UNA INTERVENCIÓN EDUCATIVE

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ABSTRACT

Objective: To evaluate the effect of an educational intervention on the knowledge of adolescents about leprosy. **Methods:** This is a quasi-experimental study, with an evaluative component of the knowledge of adolescents, before and after the application of an educational workshop on leprosy with 53 adolescents aged 10 to 14 years. **Results:** There was an increase in the percentage of optimal knowledge immediately after the intervention ($p<0.01$), remaining in the late post-test ($p=0.24$). The mean number of correct answers was statistically different between the immediate pre- and post-test ($p<0.01$) and was statistically equal between the immediate and late post-test ($p=0.99$). There was an increase in the number of correct answers in all items of the instrument after the intervention ($p<0.01$). **Conclusion:** It is concluded that there was an improvement in the adolescents' knowledge between the pre- and post-test immediately. Furthermore, knowledge remained statistically similar between the immediate and late post-test, suggesting a positive effect of the intervention both immediately and later.

Descriptors: Leprosy; Knowledge; Adolescent; Play and Playthings; Health education.

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RESUMO
Objetivo: Avaliar o efeito de uma intervenção educativa no conhecimento de adolescentes sobre a hanseníase. **Métodos:** Trata-se de um estudo quase-experimental, com um componente avaliativo do conhecimento de adolescentes, antes e após a aplicação de uma oficina educativa sobre hanseníase com 53 adolescentes de 10 a 14 anos. **Resultados:** Observou-se aumento no percentual do conhecimento ótimo imediatamente após a intervenção (p<0,01), mantendo-se no pós-teste tardio (p=0,24). A média da quantidade de acertos foi estatisticamente diferente entre o pré e pós-teste imediato (p<0,01) e foi estatisticamente igual entre o pós-teste imediato e tardio (p=0,99). Verificou-se aumento no número de acertos em todos os itens do instrumento após a intervenção (p<0,01). **Conclusão:** Conclui-se que houve melhora no conhecimento dos adolescentes entre o pré e o pós-teste imediato. Ainda, o conhecimento manteve-se estatisticamente similar entre o pós-teste imediato e tardio, sugerindo um efeito positivo da intervenção tanto imediatamente, quanto tardiamente.
Descritores: Hanseníase; Conhecimento; Adolescente; Jogos e Brinquedos; Educação em saúde.

RESUMEN
Objetivo: Evaluar el efecto de una intervención educativa sobre el conocimiento de los adolescentes sobre la lepra. **Métodos:** Se trata de un estudio cuasi-experimental, con un componente evaluativo del conocimiento de los adolescentes, antes y después de la aplicación de un taller educativo sobre lepra con 53 adolescentes de 10 a 14 años. **Resultados:** Hubo un aumento en el porcentaje de conocimiento óptimo inmediatamente después de la intervención (p <0.01), permaneciendo en el post-test tardío (p = 0.24). La media del número de respuestas correctas fue estadísticamente diferente entre la prueba previa y posterior inmediata (p <0.01) y fue estadísticamente igual entre la prueba posterior inmediata y tardía (p = 0.99). Hubo un aumento en el número de respuestas correctas en todos los ítems del instrumento luego de la intervención (p <0.01). **Conclusión:** Se concluye que hubo una mejora en el conocimiento de los adolescentes entre el pre y post test de forma inmediata. Además, el conocimiento se mantuvo estadísticamente similar entre la prueba posterior inmediata y tardía, lo que sugiere un efecto positivo de la intervención tanto inmediatamente como más tarde.
Descriptores: Lepra; Conocimiento; Adolescente; Juego e Implementos de Juego; Educación para la salud.

INTRODUCTION

Leprosy, also known as leprosy, is a chronic granulomatous infection caused by Mycobacterium leprae and Mycobacterium lepromatosis, which mainly affect the skin and peripheral nerves. Considered a neglected tropical disease, it mainly affects low-income people in developing countries, and can cause deformity and disability if not diagnosed early and treated in a timely manner.[1]

The risk of becoming ill is directly related to the specific immunological conditions of each individual, the endemic levels, socioeconomic conditions, the situation of crowding people living in the same room and prolonged contact with the index case of the disease in the last five years.[1] Still, individuals younger than fifteen years old are more predisposed to the

disease than other family members, especially when living in endemic areas.[2]

The offer of treatment was fundamental for reducing the burden of the disease worldwide. Although the trend of the disease incidence coefficient in children under 15 years between 2001 and 2016 has been decreasing, some Federation Units and capitals of Brazil maintained the situation of hyperendemicity, such as Mato Grosso and Cuiabá, respectively.[3] This coefficient is the main indicator for monitoring and controlling the endemic disease, as it reveals the continued transmission of the bacillus and the difficulty of the services in eliminating it.[2]

A review of new case detection in the three most endemic countries indicated that the number of new cases and the proportions of child cases and cases with disabilities remained more or less unchanged in Brazil and Indonesia over the past 5 years. The draft Global Leprosy Strategy for the period 2021–2030 is in line with "Ending neglect to achieve the Sustainable Development Goals – a roadmap for neglected tropical diseases 2021–2030". Thus, the WHO recommends the implementation of early diagnosis, timely treatment and prevention actions, to reach the goals by 2030. They also emphasize that it is time to intensify prevention initiatives to achieve the goal of eliminating leprosy.[2]

A systematic review of the literature on leprosy in children under 15 years old in Brazil shows that, as the detection rate of leprosy remains high in most studies, the proportion of cases with physical disability is also high and reflects the difficulties and the low effectiveness of actions aimed at controlling the disease. The authors point out that a new agenda needs to involve the precepts of ethical, humane and solidary care, in order to reach a new level of control of the disease in the country.[4]

One of the obstacles to the eradication of leprosy is the lack of knowledge on the part of the population. According to research carried out by nurses in the state of Mato Grosso, adolescents showed little knowledge, perceiving it as a serious, incurable disease that caused fear, shame and social isolation.[5]

In this perspective, health education is considered a very important activity for clarifying the general aspects of the disease, demystifying the negative conceptions attributed to it, such as death, incurability, isolation and social contempt.[5] It also encourages the population to seek health services when suspecting the disease and eliminates false cultural concepts.

Most educational interventions on leprosy with adolescents are developed by nurses in the school environment, and this space/context is recognized as the best place to carry out such actions with this public,

enabling the reach of subjects in an interactive and participatory way.[6]Among the pedagogical strategies available, educational games demonstrate great acceptability among adolescents and potential to reach the essential domains for an effective health intervention.[7]

Playful and interactive educational interventions involving adolescents promote the improvement of knowledge about leprosy. However, in existing studies, knowledge was not assessed by applying validated and reliable instruments.[6] Thus, it is necessary to evaluate the effect of educational interventions through validated and reliable instruments, such as the research presented here. Therefore, the present study aimed to evaluate the effect of an educational intervention on the knowledge of adolescents about leprosy.

METHODS

This is a quasi-experimental before-and-after study, with an evaluative component on the knowledge of adolescents,before and after the implementation of an educational workshop on leprosy. This type of study is used when the intention is to observe an intervention and there is no use of random allocation in the formation of the respective comparison groups. Its purpose is to verify the effects of a given intervention, comparing two moments, before and after its implementation, in the same group.

The study was carried out in a state public school in the urban area of Cuiabá, capital of Mato Grosso (MT), Brazil, randomly drawn among all schools through the "random" function of the Excel software®.The public school was included in the study after obtaining authorization from its manager to carry out the research.

The school is considered an ideal place for the development of health promotion practices with adolescents, especially on the subject of leprosy[6], while the expansion of health actions aimed at students in the public school system is one of the purposes of the Health at School Program.

Participants were selected for convenience, 53 in the pre-test and immediate post-test, however, the late post-test had 40 individuals. Subjects aged between 10 and 14 years old, enrolled and present at school on the day of recruitment for the research, participated in the research. All students who agreed to participate in the research by signing the Term of Assent and parental authorization through the Term of Free and Informed Consent were included. There is no consensus in the literature regarding the population required for this type of study, however samples of 20 to 30 participants have been used in similar studies.[8.9]

The pre-test and immediate post-test

data collection period took place from April 17 to 26 and late post-test from May 17 to 26, 2019. For data collection, the following instruments were used: Characterization of Adolescents and Instrument for Assessing Adolescents' Knowledge about Leprosy (IACAH).

The Adolescent Characterization Instrument was developed and validated in terms of face, content and semantics[10], obtaining a Content Validity Index of 0.93. It is self-administered and composed of 17 items, containing open and closed questions about sociodemographic and epidemiological variables of leprosy. The IACAH was elaborated and validated in terms of face, content and semantics by the same researchers[10], obtaining a Content Validity Index of 0.89. Subsequently, it was analyzed for reliability and showed an internal consistency of 0.82.[11] This is a self-administered instrument that proposes to assess the knowledge of adolescents about leprosy, consisting of 14 items (scale from 0 to 14 points in total) with closed and multiple-choice questions distributed among nine aspects, namely: definition and etiology, epidemiological facts, signs and symptoms, transmission, stigma and prejudice, diagnosis, treatment, deformities, physical disabilities and disease control measures.[10]

After authorization from the school, assent from the participants and authorization from parents/guardians, data collection began. The instruments were given to the adolescents in a room offered by the school for completing the instruments and carrying out the intervention, and were collected by the researchers after filling them out.

Initially, groups of five to six participants were formed, and then the first stage of the research was carried out, which consisted of applying the Adolescent Characterization instrument and the IACAH, to assess pre-existing knowledge about leprosy (pre-test), with an average duration of 20 minutes in each group. After applying the pre-test, the intervention designed by other researchers was carried out.[12] The application of this followed the script established by the authors, encompassing five dynamic techniques already known and disseminated in the electronic medium: adjective; face; semaphore; true or false and; mosaic.[12] Table 1 shows the dynamics techniques, worked knowledge and application time of the educational workshop.

Table 1. Distribution of dynamic techniques, worked knowledge and application time in adolescents. Cuiabá, MT, Brazil, 2021.

Techniques	Worked knowledge	Application time
Adjective	Memorization of names and group integration.	10 minutes
Face	Illness, fear and stigma concept	30 minutes
Semaphore	Classification, signs and symptoms and transmission of the disease	30 minutes
True or false	Diagnosis and treatment of the disease	30 minutes
Mosaic	Representation/meaning of participation in the educational workshop by adolescents.	20 minutes

Source: Adapted[12]

The objective of the educational workshop was to promote, reflect on and raise awareness of leprosy among the target audience. The activity was developed by the researchers at the school, after the pre-test, in groups of five to six participants, with a total duration of two hours.

Subsequently, the effects of the intervention were evaluated using a two-stage post-test. In the first stage, the IACAH was applied immediately after the intervention (immediate post-test) and, in the second, 30 days after the intervention (late post-test). The immediate post-test aimed to assess the immediate effect of the intervention on the adolescents' knowledge about the disease, and the late post-test aimed to assess whether the effect of the intervention was sustained on the adolescents' knowledge about the disease, ensuring the sustainability of knowledge.

The dependent variable corresponded to the participants' correct answers to the IACAH items (know and don't know). The classification of the adolescents' knowledge about leprosy varied between (insufficient, regular, good and excellent). The evaluation of the questionnaire was carried out taking into account the correct answers in percentages (from 0 to 100%) and in categories, as follows: insufficient (up to 24% of correct answers), regular (25% to 49% of correct answers), good (50% to 74% of correct answers) and great (75% to 100% of correct answers).[9]

The sociodemographic characteristics were considered as independent variables, such as: age, gender, school year, length of study; and the epidemiological characteristics: if you have heard or received information about leprosy, where you heard about or received information about leprosy, if you know what leprosy is, if there are or were cases of leprosy in the family, if he/she, teenager, has or has had leprosy (yes and no).

The database was tabulated in Excel® software with independent double typing. Data were compared using the Data Compare tool and inconsistencies were corrected by consulting the original collection documents.

Then, the descriptive analysis of the variables was performed with the calculation of the mean, median, mode, standard deviation, absolute and relative frequencies. To assess whether the educational intervention was capable of improving students' knowledge regarding leprosy, the linear model of mixed effects was adjusted with the response variable the percentage of correct answers and the covariate the moment of evaluation of the questionnaire (pre-test, post-test immediate and late post-test).

In this model, a random intercept was adopted as a function of adolescents. The estimation method was restricted maximum likelihood, with F test for main effects and t test, with Bonferroni correction, for multiple comparisons. Mixed generalized linear models, with gamma and inverse normal distributions and canonical link functions, were fitted. However, the AIC criterion values were not better than the specified mixed linear model. In addition to the mixed linear model, the McNemar test was applied to compare the performances of the participants in the IACAH in relation to the categories of correct answers (insufficient, regular, good and excellent) and in each item. All statistical analyzes were performed with a significance level of 5% using the R software.

The present study is part of a matrix research entitled “Health education and active search for leprosy in children under fifteen years of age in Cuiabá, MT”, approved by the Research Ethics Committee, under opinion 1,579,925. All ethical prerogatives of Resolution No. 466/2012 of the National Health Council were followed.

RESULTS

The sociodemographic and epidemiological characteristics of the adolescents participating in the study are shown in Table 1.

Table 1. Sociodemographic and epidemiological characterization of adolescents participating in educational workshops on leprosy.Cuiaba, MT, Brazil, 2021.

Characteristics		**No**	**%**
Gender	Female	28	52.8
	Male	25	47.2
School year	5th	11	20.8
	6th	13	24.5
	7th	18	34.0
	8th	8	15.0
	9th	3	5.7
Time at school studied (year)	Less than 1	11	20.8
	1-3	21	39.6
	more than 3	21	39.6
Heard about/received information about leprosy	No	29	54.7
	Yes	24	45.3
Do you know what leprosy is	No	43	81.1
	Yes	10	18.9
Have or have had leprosy	No	52	98.1
	Yes	1	1.9
Leprosy cases in the family	No	47	88.7
	Yes	6	11.3
Total		53	100.0

Regarding the level of knowledge, it was observed that in the pre-test, 49.1% of the adolescents (n=26) had insufficient and regular knowledge, however, after the intervention, it was found that there were no adolescents with insufficient knowledge and regular, both in the immediate and late post-test (Table 2). It is noteworthy that the percentage of adolescents with excellent knowledge increased from 7.5% (n=4), in the pre-test, to 92.5% (n=49;P <0.01) and for 97.5% (n=39;P <0.01) in the immediate and late post-test, respectively. Since, the knowledge classified as excellent between the immediate and late post-test was statistically equal in both moments (P =0.24).

Table 2. Distribution of adolescents according to the level of knowledge about leprosy, verified in the pre-test (n=53), immediate post-test (n=53) and late post-test (n=40).Cuiabá, MT, Brazil, 2021.

Level of knowledge about leprosy	**Pre-test**		**Post test Immediate**		**Post test Late**	
	n	%	No	%	n	%
Insufficient	11	20.8	0	0.0	0	0.0
Regular	15	28.3	0	0.0	0	0.0
Good	23	43.4	4	7.5	1	2.5
Excellent	4	7.5	49	92.5	39	97.5
Total	53	100.0	53	100.0	40	100.0

Table 3 shows the evaluation of the pre-test, immediate post-test and late post-test, according to the number of correct answers given by the participants, as well as the estimates of the fixed and random effects of the mixed linear model, since the effect of the moment of evaluation factor is statistically significant by the F test ($F(2, 95) = 220$, $p < 0.01$). Comparing the mean difference in the percentages of correct answers for items in the pre-intervention and immediate post-intervention moments, $p < 0.01$ was obtained for the t test, with Bonferroni correction, indicating that the number of correct answers was statistically different in both moments. Sequentially, when comparing the average percentage of correct items in the immediate and late post-intervention moments, $p = 0.99$ was obtained for the t test, indicating that the number of correct answers was statistically equal in both moments. It is noteworthy that the difference in correct answers, in percentage, between the immediate post-test and the pre-test was 50.40.

Table 3. Evaluation of the pre-test (n=53), immediate post-test (n=53) and late post-test (n=40), according to the number of correct answers given by adolescents on a scale from zero to 14 points and model estimates mixed linear for the percentage of correct answers according to the evaluation moments. Cuiabá, MT, Brazil, 2019.

Number of hits	**Average**	**DP**	**Fashion**	**Med.**	**Max.**	**Min.**
Pre-test	6.28	3.26	8	7	13	0
Immediate post-test	13.34	1.41	14	14	14	8
Late post test	13.50	1.06	14	14	14	8
Fixed effects	**I estimated**	**EP**	***P***			
Intercept	78.90	1.55	< 0.01			
Immediate post-test – Pre-test	50.40	2.73	< 0.01			
Late post-test – Pre-test	51.52	2.98	< 0.01			
Late post-test – Immediate post-test	1.11	2.98	0.99			
random effects	**DP**	**ICC**				
Teenagers (intercept)	7.26	0.21				
Waste	14.05					

SD = standard deviation, Med. = median, Max. = max, Min. = minimum, SE = standard error of estimate, p = p-value of the t-test with Bonferroni correction, ICC = intraclass correlation coefficient.

As for the evaluation of the participant's performance for each IACAH item, there was an increase in the number of correct answers in all when comparing the pre-test with the immediate post-test (*P* <0.01) and pre-test with late post-test (*P* <0.01). Also, when comparing the immediate post-test with the late one, only items 13 and 14 of the IACAH obtained *P*<0.05, the others presented *P* >0.05, with statistically similar values between both moments.

DISCUSSION

In this research, almost half of the participants had an insufficient or regular level of knowledge about leprosy and a low median number of correct answers on the instrument before applying the intervention (pre-test). However, right after the application of the intervention, most participants had excellent knowledge and a high median number of correct answers, with statistical significance, both in the post-immediate test, as in the late test, revealing the effectiveness of the intervention. Also, the knowledge and the number of correct answers in the immediate and late post-test were statistically similar, indicating that the effect of the intervention was maintained, guaranteeing the sustainability of knowledge in the established time interval.

As in the present study, other studies also identified poor knowledge of leprosy in most participants.[13.14] A study carried out with 109 adolescents in Rio Grande Norte (RN) found that 51.37% of those surveyed had already heard about leprosy, however it showed a high lack of knowledge among adolescents regarding the etiology, signs and symptoms and mode of transmission.[13]In turn, an international survey carried out with 446 individuals aged 16 to 90 years revealed little knowledge about leprosy and high levels of stigma, fear and desire to maintain social distance in relation to people with the disease.[14]

The lack of knowledge about leprosy makes the teenager not understand the general aspects of the disease, delaying the diagnosis and treatment.[5] The representations constructed by adolescents about leprosy are composed, above all, of negatively valued elements, such as fears, prejudice and social isolation, originating from the lack of information about the disease and beliefs associated with the situation of the disease in the past.[15]

It should be noted that leprosy is a hyperendemic disease in the state of Mato Grosso among children under fifteen years of age, with a growing trend in the period from 2001 to 2013, in the proportion of multibacillary cases and cases with grade 2 physical disability at the time of diagnosis.16 This indicates the presence of late diagnosis with permanence of sources of transmissibility and consequent aggravation

of the endemic in the state, therefore, requiring the implementation of new strategies for the prevention and control of the disease, such as educational actions.

Educational activities in schools are essential for building knowledge, deconstructing false concepts and demystifying culturally established myths and taboos.[11] Educational interventions also result in awareness and increased autonomy of individuals in relation to early recognition of the disease and referral to health services, with a view to early diagnosis and timely treatment.[17]

The school environment stands out as a favorable space for this type of action, since it favors the construction of knowledge and values that enable assertive attitudes and practices in health.[6]"It is necessary to establish dialogic meetings of information about the disease, in order to enable reflection and re-signification of hegemonic representations about it".[15]

In a survey carried out with 1,263 adolescents in Cuiabá, Mato Grosso, it was found that 75% had not previously participated in an educational activity on leprosy[18], a finding similar to that of the present study. It is noteworthy that the school and the media are recognized as important sources of information for adolescents in dealing with this issue.[10] In general, the media, such as the internet, television and other means of communication, is an important ally for the dissemination of information about the disease, aiming at prevention and control, and the majority of the population has access to some means of communication.

It should be noted that, after the educational intervention, the results obtained in the present study portray a positive change in the knowledge of adolescents regarding the theme addressed. Similarly, a study carried out in Rio Grande do Norte with 109 adolescents aged 13 to 17 years showed that, after an educational intervention developed by nurses in the format of dialogued exposure, there was a significant change in knowledge about leprosy, confirming the effectiveness of health education.[13] Still, in another descriptive study carried out with 190 adolescents from the same state, it was observed in the post-test, positive results in the learning of individuals after health education activities, in the format of dialogued exposition with the support of posters and information, also elaborated by nurses.[17]

Opportunely, this research used educational games as a method to develop a health intervention. Interventions based on educational games have been used in research with various health themes, enabling the construction of knowledge and allowing decision-making through illustrative, motivating and innovative

strategies.[9.19]

Furthermore, a previous study that sought to describe the meaning attributed by adolescents to this educational intervention on leprosy mediated by games, identified that adolescents expressed joy and satisfaction for participating in the intervention. The elements brought in their speeches emphasized the general aspects of leprosy acquired from games and the possibility of acting as transforming agents of reality in the face of leprosy.[19]

For scholars, when using ludicity in educational activities, it is possible to obtain effective and meaningful learning.[20] Furthermore, it is emphasized that educational interventions to result in changes in attitudes and practices need to be periodic and continuous, using stimuli and elucidative strategies so that knowledge acquires sustainability and is expanded, not exhausting the dialogue on a subject in a single time.[9]

It is emphasized that health education aims to increase the autonomy and self-care of the population on a given topic, requiring the use of critical and reflective thinking in order to transform the analyzed reality. Educational practices with adolescents about leprosy are capable of promoting changes in knowledge when they are based on constructivist methodology, anchored in a specific and multifaceted approach.

In this context, it is worth pointing out the relevance of the nurse's role in educational practices on leprosy, with the professional sensitivity to recognize the best methods and resources to carry them out successfully.[6]In the context of primary health care, educational action is an activity inherent to the work of nurses, professionals who stand out for their ability to assess the care-educational needs of individuals and implement actions aimed at access to and quality of care the health.[9]

CONCLUSION

It is concluded that there was an improvement in the adolescents' knowledge between the pre-test and the immediate post-test, with a statistically significant difference. Still, knowledge remained statistically similar between the immediate and late post-test,suggesting that the effect of the intervention was maintained in the established time interval.

The study revealed a prior lack of knowledge on the part of adolescents about leprosy. In this sense, the school is highlighted as a promising space for the debate of the most prevalent health problems in this population, such as leprosy, which is hyperendemic in the state. This educational technology can be used by nurses and other health professionals with adolescents in order to promote health and prevent leprosy.

Among the limitations of the

research, the sample restricted to a public school and those related to the study method itself stand out, with the absence of a control and follow-up group. There was difficulty in carrying out the late post-test due to the teaching strike at the school during this stage of the research, with losses of adolescents who did not return to carry out the same. The continuation of new studies with this technology is proposed in order to verify its effectiveness in other populations and in other contexts.

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Study limitations should be mentioned in the conclusion

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