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Title : Effects of an educational comic book on epilepsy-related knowledge, attitudes and practices among schoolchildren in Madagascar

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Title : Effects of an educational comic book on epilepsy-related knowledge, attitudes and practices among schoolchildren in Madagascar

1. Introduction

Epilepsy is defined by the World Health Organization (WHO) as a chronic noncommunicable disease of the brain characterized by abnormally excessive or synchronous neuronal activity in the brain, resulting in seizures which can lead to brief episodes of involuntary movement that may involve part of, or the entire, body, and sometimes accompanied by loss of consciousness and control of bowel or bladder function [1]. This chronic neurological disorder is found in all regions of the world and it affects all people, regardless of their age, sex, or socio-economic background [1].

It is one of most common neurological disorders in the world. The WHO estimates that the number of people living with epilepsy is approximately 50 million, representing 0.8% of the global population. Nearly 80% of these patients live in low- and middle-income countries (LMICs) [1]. In these countries, epilepsy represents a major public health issue, both from a medical and societal perspectives, due to the impact of the disease on people's lives and to the high treatment gap. The treatment gap is defined as the percentage of people with active epilepsy who are not being treated appropriately in a given population at a given time. In Madagascar, the treatment gap is estimated at 92% [2].

In LMICs, in addition to the high prevalence of the disease, the small number of specialists, the insufficient training of primary healthcare professionals, the lack of diagnostic equipment and the low availability and affordability of antiepileptic drugs are also important issues [3, 4], all contributing to the high treatment gap. Furthermore, in sub-Saharan Africa, the prevalence of epilepsy is actually two to three times higher than in high-income countries [5].

In African countries, as is the case in many LMICs, misconceptions and prejudices surrounding epilepsy, which often originate from local beliefs are common barriers to access to care for people with epilepsy. They often lead to stigmatisation and exclusion of those living with epilepsy [1]. This is the case in particular with children, amongst whom epilepsy is often considered as a contagious disease, and sometimes of supernatural origin [6, 7]. In a study conducted amongst secondary school children in Enugu in Nigeria, approximately 41% thought that epilepsy was contagious and 19% thought it was of supernatural origin. Nearly 65% of children would not remain friends with a person with epilepsy and 84% would not marry someone with epilepsy [7]. In a study performed in Cameroon, 58% of children interviewed thought that epilepsy was contagious, nearly 38% did not want to be associated with a person with epilepsy and nearly 48% would refuse to marry someone with epilepsy [6]. Similar findings have also been highlighted amongst the Malagasy population [8].

Recent reviews have highlighted the paucity of published data regarding the efficacy of interventions to reduce the misconceptions and prejudices linked to epilepsy [9,10]. The few interventions assessed for their efficacy in these reviews were mainly lectures and videos, with limited effects. The authors highlighted the need to develop and test culturally acceptable and feasible interventions to address the many misconceptions about epilepsy, and the stigma it leads to.

Comic books can be a very effective way of communicating messages to raise public awareness, particularly among children. The use of comic books in behaviour change communication activities has actually shown positive effects in public health areas as varied as the awareness and prevention of burns in children in India and the United States [11], the promotion of a healthy diet in children from Hispanic and African-American communities in New York [12], the prevention of low back pain in school children in Spain [13] and also vaccination against infections linked with human papillomavirus (HPV) in the United States [14].

For epilepsy, the Ethiopian version of “Savane Bien”/“We’ll make it”, a comic book developed by Sanofi, has also shown a positive effect on the knowledge, attitudes and practices (KAP) of Ethiopian children. It was demonstrated in a study conducted in a school in an urban area in Addis Ababa as well as in a school in a rural area in Chacha [15]. Similarly, “Guitar Heroes” an educational comic book developed for Latin American children, was recently shown to improve epilepsy related KAP among high school students in rural and urban areas of the Bolivian Chaco region [16].

“Savane Bien”/“We’ll make it”, is a 43 page educational comic book which was developed by a neurologist, and an illustrator specializing in Behavior Change Communication (BCC). The sociocultural background, and the main characters in the comic book have been designed to appeal to African children from both traditional rural and more modern urban backgrounds.

As the Ethiopian version of Sanofi’s comic book had been shown to have a positive effect on knowledge, attitudes and practices regarding epilepsy among Ethiopian children [15], a Malagasy version of “Savane Bien”, entitled “Ao Tsara” was developed, with the objective to raise awareness and understanding of epilepsy among children in Madagascar and help fight the stigma and discrimination faced by people with epilepsy .

The primary objective of this study was to assess the effect of a single reading of the comic book “Ao Tsara” on the knowledge, attitudes and practices towards epilepsy of children in Malagasy schools. Secondary objectives were to compare the effect of the comic book on school children in rural areas and school children in urban areas, as well as to assess children’s interest in this comic book.

2. Methods

This was a quasi-experimental study of the before/after type aiming to compare data collected on the knowledge, attitudes and practices with regard to epilepsy before and immediately after reading the “Ao Tsara” comic book.

2.1. Study area

The study was conducted in two schools which were randomly selected, one in an urban area and one in a rural area. West Ambohijanahary primary public school which is located in an urban area of the district of Antananarivo, which is the capital of Madagascar, in Analamanga region, and Behenjy primary public school, which is located in a rural area, in the Ambatolampy district, 40kms from Antananarivo, in Vakinankaratra region, were both selected.

2.2. Study population

The study was conducted among children from CM1 (*Cours Moyen 1* [year 5, primary school]) or CM2 [year 6]) classes in the selected schools, regardless of their age at the time of the study.

To detect a difference of 20% in the proportion of correct responses to the main question (“Are there effective drugs to treat epilepsy?”) with a proportion of 30% correct answers at baseline, with a power of 80% and an alpha risk of 5%, using a random cluster sample (a cluster is a class) and using a before/after reading the comic book-type design in the same subjects, it was determined that at least 103 subjects were required. With a margin of around 10% of non-assessable subjects, the sample size was 113 subjects for the urban area and 113 for the rural area, thus 226 subjects in total. This number was compatible with the inclusion of around two or three classes in the rural and urban areas.

2.3. Questionnaires to assess knowledge, attitudes, and practices

Data were collected using two identical questionnaires including multiple-choice questions and single-choice questions (Appendix 1), except for the two questions to assess children's interest for, and perceived value of, the comic book, which were only used in the questionnaire after reading the comic book.

These questionnaires were derived from the one used in the study conducted in Ethiopia [15] and following an international workshop held in September 2016 during which, protocol and questionnaires were further discussed. Individual questions were also adjusted, later-on, to reflect local beliefs and customs.

There were 13-15 questions in the questionnaires:

- One question (Q2.1) about whether or not they had already seen someone having a seizure
- Six questions (Q2.2 to Q2.7) about their knowledge and understanding of epilepsy, about the symptoms, the potential causes of epilepsy, whether it is contagious, how it can be diagnosed, whether there are effective treatments.
- Six questions (Q3.1 to Q3.7) regarding their attitudes and practices: what they would do if they saw someone having a seizure, what advice they would provide to a family of someone living with epilepsy, what they would do if they had a friend with epilepsy, whether they would allow their own brother or sister to marry someone with epilepsy and whether they would let children with epilepsy go to school
- Two questions (Q4.1 & Q4.2) regarding how much they had learned about epilepsy via the book and how much they had enjoyed the comic book.

These questionnaires were available in Malagasy language and were completed just before, and immediately after reading the comic book.

Piloting of the questionnaire was done to ensure that the questions were properly understood and to ensure that the time allocated (20 minutes for completing the questionnaire – 60 minutes for reading the comic book) was sufficient.

2.4. Study procedure

The study was conducted in February 2019.

A standardized procedure was carried out in each school according to a schedule approved by the Ministry of Education which included the following steps:

- Meeting with the school principal, information regarding the objectives of the survey and what was expected of the students. An explanatory note, a copy of the questionnaire and a comic book were also provided at the start of the visit before meeting with the children.
- Meeting with the children in the classroom, in presence of the school principal, brief presentation of the evaluation process and how to complete the questionnaires.
- The first questionnaire was distributed to the children and then collected 20 minutes later. The comic books were then distributed to the children, then collected after 60 minutes. The second questionnaire was then distributed to the children leaving them 20 minutes to complete it.
- The comic books were then given back and left at the children's disposal in the classroom; children were thanked for their effort, explanations and recommendations were also given at the end of the session to clarify any potential misunderstandings.

2.5. Statistical analysis

To compare the pre and post-reading questionnaire responses, we used paired statistical analyzes. A scoring system was also used to get an average score for each child before and after reading the comic book. For single choice questions, 1 point was awarded for a correct response. For multiple-choice questions, we also awarded 1 point for each correct response but then adjusted the maximum score for the question to 1 point; in other words, a question, whether it was single-choice or multiple-choice, had the same weight.

A knowledge sub-score was calculated based on five of the six knowledge items (Question 2.5 was not included as it was a sub-question for those who had replied incorrectly to 2.4: "If you think that epilepsy is contagious, how can it be transmitted?"). Similarly, an attitudes-practices sub-score was calculated based on the six attitudes-practices items. Finally, the average between the two sub-scores gave us the global KAP score. For the various scores and sub-scores, whether it be global KAP score, knowledge sub-score or attitudes-practices sub-score, they were adjusted so that the maximum possible score was 20. These various scores were calculated for the entire population, combining both rural and urban areas, as well as individually for each type of area.

A paired Student test was used to compare the means before and after reading the comic book. A Student test was used to compare the means between urban and rural areas. A McNemar's test was used to compare responses to each individual questions pre and post reading the comic book. Data management and statistical analysis were performed using R and STATA 13 software. The significance level was set at $p \leq 0.05$.

2.6. Ethics

The study protocol was approved by the Ethics Committee of Biomedical Research of the Ministry of Public Health, Madagascar (Comité d'Ethique de la Recherche Biomédicale - CERBM).

3. Results

3.1. Demographic characteristics of the study population

A total of 244 students were recruited, including 125 in the urban area and 119 in the rural area. The mean age was 11.4 ± 1.4 years. The 11-12 age group accounted for 48.4% of children. We observed a male predominance (sex-ratio = 1.36) both in the urban area (sex-ratio = 1.35) and in the rural area (sex-ratio = 1.38). There were slightly more children from CM1 class (55.3%) than from CM2 (44.7%). (Table 1)

3.2 Knowledge sub-score

For both urban and rural areas, we observed a significant improvement between the mean knowledge sub-scores before and after reading the comic book (10.2 ± 3.0 vs 12.9 ± 2.7 ; $p < 0.001$). These improvements in knowledge were significant both in urban (10.0 ± 2.8 vs. 12.6 ± 2.5 ; $p < 0.001$) and rural areas (10.4 ± 3.1 vs. 13.2 ± 3.0 ; $p < 0.001$) (Table 2). In addition, we also observed that there was no significant difference in knowledge sub-scores between rural and urban areas at baseline, i.e. prior to reading the comic book (10.4 ± 3.1 vs 10.0 ± 2.8 ; $p = 0.3$). After reading the book, there was a trend towards a better score in the rural school compared to the urban school (13.2 ± 3.0 vs 12.6 ± 2.5 ; $p = 0.053$) even if the difference did not quite reach statistical significance. (Table 3)

Overall, nearly a third of the study population had seen someone having an epileptic seizure (28.6%) with no significant difference between students in urban and rural areas. Only 29.5% of children thought epilepsy was not contagious prior to reading the comic book, which increased to 44.3% ($p < 0.001$) after reading the comic book. At baseline it was actually 36.0% of children in the rural school and only 22.7% of children in the urban school who stated that epilepsy was not contagious. After reading the comic book, 55.2% and 36.0% of rural

and urban school students, respectively, stated that epilepsy was not contagious. This improvement was significant in rural areas ($p < 0.001$), but not in urban areas ($p = 0.051$). (Table 4)

In contrast, the proportion of rural children who said epilepsy was an inherited disease was very high (40.0%) before reading the comic book. After they had read the comics, there was a significant decrease in this proportion (16.8%, $p < 0.001$). Knowledge of the electroencephalogram as a diagnostic tool improved in both areas. Overall, the proportion of children acknowledging this diagnostic tool was very low prior to reading the comic book (11.0%), and it remained low after reading it (29.1%) even if the difference was significant ($p < 0.001$). Regarding whether there are effective anti-epileptic drugs, a significant improvement was observed after reading the comic book (48.8% vs 65.2%, $p < 0.001$). (Table 4)

3.3. Attitudes-practices sub-score

Overall, the mean attitudes-practices sub-score increased significantly (8.7 ± 2.3 vs. 9.5 ± 2.4 ; $p < 0.001$). These results were also significant for primary school children in the rural area (8.6 ± 2.2 vs. 9.7 ± 2.2 ; $p < 0.001$). However, in the urban area, the difference between before and after reading the comic book was not significant (8.9 ± 2.3 vs 9.3 ± 2.6 ; $p = 0.08$). (Table 2)

At baseline, prior to reading the comic book, there was no significant difference in these sub-scores between rural and urban children (8.6 ± 2.2 vs 8.9 ± 2.3 ; $p = 0.40$), and similarly after reading the comic book (9.7 ± 2.2 vs. 9.3 ± 2.6 ; $p = 0.20$). (Table 3). It should be noted that the sub-score for attitudes-practices was low at baseline (out of a maximum score of twenty), and remained so after reading the comic book.

First aid and attitudes towards someone having a seizure improved only marginally after reading the comic book, with no more than 22.1% of children saying they would move them away from any danger (vs 16.8% at baseline, $p=0.06$) and 22.5% they would turn them on their side into the recovery position (vs 14.3% at baseline, $p=0.004$), even though traditional practices such as throwing green leaves or water, or praying, both declined significantly. Overall calling a doctor increased from 65.1% to 82.3% ($p < 0.001$). Although there was an improvement in the urban school in some of the stigmatizing and discriminating attitudes, with, for example, a greater proportion of children responding they would have closer contact with a friend with epilepsy to provide them with support (62.2% post reading vs 46.2% pre, $p=0.002$), this improvement was not observed in the rural area. Almost half of the children also responded they would support their brother or sister if they wanted to marry someone with epilepsy, with no difference between pre- and post-reading the comic book (47.1% and 48.0%; $p = 0.86$). (Table 4)

3.4. Global KAP score

Overall, the global KAP score, combining both knowledge sub-score and attitudes-practices sub-score, showed a significant improvement after reading the comic book (9.4 ± 1.8 vs 11.2 ± 1.9 ; $p < 0.001$). This improvement was shown both for the rural area (9.5 ± 1.9 vs 11.4 ± 1.9 ; $p < 0.001$) and for the urban area (9.4 ± 1.7 vs 10.9 ± 1.8 ; $p < 0.001$). (Table 2)

When comparing scores at baseline, there was no significant difference between children in rural and urban areas (9.5 ± 1.9 vs. 9.4 ± 1.7 ; $p = 0.70$). However, after reading the comic book, the mean score for children in the rural area was higher than for children in the urban area (11.4 ± 1.9 vs 10.9 ± 1.8) with a significant difference ($p = 0.02$). (Table 3)

3.5. Perceived learning from, and appreciation of, the comic book "Ao tsara"

After reading the comic book "Ao Tsara", the majority of children responded they had learned a lot about epilepsy. In addition, more children in the urban school stated they learned a lot (76.5%) than in the rural school (56.8%). This difference was significant ($p = 0.004$). (Table 5)

Regarding how much children enjoyed the comic book, over half of them selected the highest score "4 - enormously" with no significant difference between rural and urban areas. (Table 6)

4. Discussion

In this study, overall, there was a significant improvement in the global KAP score after reading the comic book, however this appeared to be mainly driven by the increase in the knowledge sub-score which reached a reasonable level post reading (12.9) while the attitudes & practices sub-score remained low, even after reading the comic book (9.5), and despite a significant increase.

Our study is the first to explore the use of an epilepsy related educational comic book in schoolchildren in Madagascar. Moreover, few studies have been carried out in other countries in order to assess the effect of epilepsy related comic books [15, 16].

A door-to-door survey conducted in 1997 in the general population of Antanarivo (representative of the highlands of Madagascar), among subjects 17 years and older, regarding KAP towards epilepsy showed that knowledge and practices had evolved significantly since 1983 [8]. A greater number of people stated they were seeking care from medical doctors (66.2%) rather than from traditional healers (15.1%) or religious exorcists (11.1%) (vs 56.2%, 26.5 % and 2.8 % respectively in 1983) [8]. However, attitudes towards people with epilepsy remained more ambivalent: if the majority of people interviewed in 1997 would authorize people with epilepsy to work (66.1%) and get married (72%), only 22.8% would let them go out on their own, and only 44.3% would allow them to go to school [8].

In our study, understanding epilepsy as a brain disease or as a potential consequence of a head trauma (45.6% and 42.4% in the urban school, 44.5% and 36.9% in rural school, respectively, before reading the comic book) was higher than among older children from secondary schools in Egypt (8.5%) [17] and Cameroon. (18.5%) [18], but slightly less than in other previous studies in older students from preparatory schools in Ethiopia (55.8%) [19], secondary schools in Cameroon (86.1%) [18] and high schools in India (50.4%) [20]. In the Ethiopian quasi-experimental study of the before-after type, previously referred to, students showed at baseline lower knowledge regarding this item (13.1%) in the urban area and slightly higher knowledge (53.0%) in the rural area [15]. However, after reading the Amharic version of the same comic book, the Ethiopian study showed a higher knowledge with more than 80.0% correct responses, while our study was at 63.0%.

Overall, the effects of the Amharic version of the comic book, whether they be on knowledge, attitudes or practices, were more pronounced than for the Malagasy version.

The differences in the age of the subjects involved in these studies and the school classes they belonged to could potentially explain some of the differences in the results. In Ethiopia, the study was conducted in preparatory schools with students who were 16-20+ years old, while our study was conducted in primary schools with children who were aged between 8-12+ years. Such difference in age can result in very significant differences in the ability to read and understand.

Our intervention was based on independent reading of the comic book by each individual child, on their own. The study conducted in Bolivia tested a more interactive reading, in small groups, integrating character impersonation, and suggested that this could lead to better outcomes [16].

In our study, possession by evil spirits or curses were among the causes of epilepsy cited by nearly half of the children at baseline, and this did not change after reading the comic book ($p = 0.2$) (Table 4). In the Ethiopian study, similar results were seen at baseline in the urban school with 56.3% of children citing evil spirit/curse as a potential cause of epilepsy, a level similar to what had been shown in another study conducted in Ethiopia in a similar population (evil spirit 33.2%, punishment for wrong doing 17.6%, and witchcraft 9.6%) [18]. In the Ethiopian study, there was a significant improvement regarding this belief after intervention [15], whereas our study did not show any effect of the comic book

We found in our study a significant improvement for the question regarding whether there are effective drugs to treat epilepsy (67.2% before reading the comic book vs 89.7% after reading it) (Table 4). The Ethiopian study, in an older, more mature, population showed a slightly better result after reading the comic book (92.2% in the urban area and 97.3% in rural area) [15].

Similarly, significant improvements were shown in our study regarding seeking medical care, whether it be calling a doctor in case of someone having a seizure (65.2% pre vs 82.4% post), or advising relatives of someone with epilepsy to go to the doctor or hospital (54.9% pre vs 75.8% post). These percentages are higher than those shown in studies to assess baseline KAPs in older children in secondary schools in Cameroon and Tanzania [6, 21].

By improving knowledge and understanding of epilepsy, it is hoped that attitudes and practices about epilepsy will also change. Our study however only showed limited changes in scores in attitudes and practices after the intervention, despite improvements in knowledge and understanding of epilepsy. In particular, the proportion of students who responded that if they saw someone having a seizure, they would move them away from any danger did not increase significantly after reading the comic book and it remained low (22.1%), and although there was a significant increase in the proportion of children who would turn a person having a seizure on their side into the recovery position, it remained low (22.4%) . Other studies have shown better baseline attitudes and practices among students with regards to people having a seizure in Cameroon (62.8%) [6] and Ethiopia (59.0%) [19].

It must be emphasized though that in these KAP studies [6,18] the subjects were also much older (mean age 16.8, range 11-28 in Cameroon [6] and mean age 17.9, range 15-29 in Ethiopia [19]) and from secondary schools, vs mean age 11.4 ± 1.5 and from primary schools in our study. The same applies to the Ethiopian comic book study [15] with students from preparatory schools with an age ranging from 16 to 20+. Older age and higher education level might translate into better knowledge regarding these topics and potentially greater maturity to grasp them.

Adding a page at the end of the comic book detailing the “do’s and don’ts” when someone is having a seizure might also help readers better understand and remember how to give first aid. Similarly, having a guided reading of the content of the comic book, and actually practicing the correct behaviours during these sessions, might also help save lives in the future.

A limitation of our study is the fact that we did not determine the impact of the comic book on children living with epilepsy themselves. Another limitation is that we have only included two schools, one in an urban area and the other in a rural area. Although there is no reason why the results would be affected by this sampling, since these schools should not be significantly different from the schools of other districts or regions. However, the socio-cultural permeation in each locality could introduce significant biases. We recognize an inflation of the alpha risk given the number of tests performed in table 4.

An additional limitation of our research is the fact that, unlike the study recently conducted in Bolivia [16], we only assessed the effects immediately after reading the comic book. Whether these effects remained sustained overtime remains unknown. Evaluating again epilepsy-related knowledge, attitudes and practices of the same children several weeks or months after reading the book might have provided some information about how long these effect could last, keeping in mind though, that the effects measured several weeks or months later could be impacted by other factors occurring during that period, and could not necessarily be solely attributed to a single reading of the comic book.

The next challenge would be to test this comic book, with the additional page on first aid in case of a seizure, in older children, and with a different approach (guided group reading with discussion), and also assess whether the changes in KAP score after a single exposure are sustained over time. That way, we could determine the most appropriate target and the method which would produce the optimal outcome among children and the general public.

5. Conclusions

The comic book “Ao Tsara” was highly appreciated by primary schoolchildren in Madagascar. Our KAP study confirmed that primary schoolchildren had limited knowledge and understanding of epilepsy and often negative attitudes and practices towards people with epilepsy prior to reading the comic book. The positive effect of a single exposure to the comic book, on epilepsy related KAP, both in a rural school and in an urban school, highlights that it can be a very valuable tool to raise awareness among children.

Educating schoolchildren can be a very effective strategy. This can have a large impact, as there will be an early acquisition of knowledge, not only at school level, but also for teachers, eventually leading in the overall community to a reduction in stigma and to more positive attitudes towards people living with epilepsy. Nevertheless, there remains room for improvement regarding the intervention: by targeting older children, adding one page to the book and adjusting to a more interactive type of group reading, the impact could potentially be optimized.

Abbreviations

BCC	Behavior Change Communication
CERBM	Comité d'Ethique sur la Recherche Biomédicale à Madagascar
EEG	electroencephalogram
HPV	human papillomavirus
KAP	knowledge, attitudes and practices
LMICs	low- and middle-income countries
WHO	World Health Organization

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Competing interests

Pierre-Emile Bruand and Clotilde Vincent are Sanofi employees and own Sanofi stocks or shares. All other authors declare that there is no conflict of interest related to the writing and publication of this article.

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Table 1 : Frequency distributions of demographic characteristics of the study subjects.

Demographic characteristics	Rural school	Urban school	Total
	N=125	N=119	N=244
Age			
8-10	47 (37.6)	27 (22.7)	74 (30.3)
11-12	61 (48.8)	57 (47.9)	118 (48.4)
>12	17 (13.6)	35 (29.4)	52 (21.3)
Mean age (\pm SD)	11.1 (1.5)	11.7 (1.3)	11.4 (1.4)
Sex			
Male	72 (57.60)	69 (58.0)	141 (57.8)
Female	53 (42.40)	50 (42.0)	103 (42.2)
Sex-ratio	1.3	1.3	1.3
Class			
CM1	57 (45.6)	78 (65.6)	135 (55.3)
CM2	68 (54.4)	41 (34.4)	109 (44.7)

Table 2 : mean KAP scores for schoolchildren in rural and urban schools, before and after reading the comic book.

	Rural, N = 125			Urban, N = 119			Overall, N = 244		
	Before Mean (SD)	After Mean (SD)	p ¹	Before Mean (SD)	After Mean (SD)	p ¹	Before Mean (SD)	After Mean (SD)	p ¹
Knowledge	10.4 (3.1)	13.2 (3.0)	<0.001	10.0 (2.8)	12.6 (2.5)	<0.001	10.2 (3.0)	12.9 (2.7)	<0.001
Attitudes- Practices	8.6 (2.2)	9.7 (2.2)	<0.001	8.9 (2.3)	9.3 (2.6)	0.081	8.7 (2.3)	9.5 (2.4)	<0.001
Global KAP	9.5 (1.9)	11.4 (1.9)	<0.001	9.4 (1.7)	10.9 (1.8)	<0.001	9.4 (1.8)	11.2 (1.9)	<0.001

¹ Paired t-test

Table 3 : comparison of schoolchildren KAP scores in rural vs urban school, before and after reading the comic book.

	Before			After		
	Rural N = 125 Mean (SD)	Urban N = 119 Mean (SD)	p ¹	Rural N = 125 Mean (SD)	Urban N = 119 Mean (SD)	p ¹
Knowledge	10.4 (3.1)	10.0 (2.8)	0.3	13.2 (3.0)	12.6 (2.5)	0.053
Attitudes-Practices	8.6 (2.2)	8.9 (2.3)	0.4	9.7 (2.2)	9.3 (2.6)	0.200
Global KAP	9.5 (1.9)	9.4 (1.7)	0.7	11.4 (1.9)	10.9 (1.8)	0.028

¹ Welch Two Sample t-test

confirm that a patient has epilepsy?									
• Electroencephalography-EEG (YES)	11 (9.2)	39 (32.7)	<0.001	16 (12.8)	32 (25.6)	0.007	27 (11.0)	71 (29.1)	<0.001
• Blood test (NO)	77 (64.7)	96 (80.6)	0.0018	96 (76.8)	112 (89.6)	0.007	173 (70.9)	208 (85.2)	<0.001
• Urine analysis (NO)	108 (90.7)	114 (95.8)	0.14	115 (92.0)	123 (98.4)	0.038	223 (91.3)	237 (97.1)	0.004
• Analysis of the stools (NO)	115 (96.6)	119 (100.0)	0.12	120 (96.0)	123 (98.4)	0.25	235 (96.3)	242 (99.1)	0.065
• X-ray (NO)	114 (95.8)	111 (93.2)	0.58	116 (92.8)	108 (86.4)	0.13	230 (94.2)	219 (89.7)	0.089
Are there effective drugs for treating epilepsy? (YES)	57 (47.9)	82 (68.9)	<0.001	62 (49.6)	77 (61.6)	0.0015	119 (48.8)	159 (65.2)	<0.001
Attitudes & Practices									
How would you react towards a person having an epileptic fit/seizure on the street?									
• Move them away from any danger (YES)	16 (13.4)	19 (15.9)	0.54	25 (20.0)	35 (28.0)	0.049	41 (16.8)	54 (22.1)	0.06
• Turn them on their side into the recovery position (YES)	18 (15.1)	25 (21.0)	0.14	17 (13.6)	30 (24.0)	0.01	35 (14.3)	55 (22.5)	0.004
• Loosen their clothing (YES)	49 (41.1)	38 (31.9)	0.048	36 (28.8)	29 (23.2)	0.17	85 (34.8)	67 (27.4)	0.01
• Call a doctor (YES)	74 (62.1)	100 (84.0)	<0.001	85 (68.0)	101 (80.8)	0.004	159 (65.1)	201 (82.3)	<0.001
• Throw green leaves or water onto them (NO)	47 (39.5)	68 (57.1)	0.0006	82 (65.6)	81 (64.8)	0.86	129 (52.8)	149 (61.0)	0.01
• Do nothing (NO)	95 (79.8)	99 (83.1)	0.43	107 (85.6)	98 (78.4)	0.07	202 (82.7)	197 (80.7)	0.4
• Do not get any closer to them (NO)	66 (55.4)	78 (65.5)	0.07	102 (81.6)	103 (82.4)	0.83	168 (68.8)	181 (74.1)	0.1
• Give them water (NO)	71 (59.6)	72 (60.5)	0.86	89 (71.2)	85 (68.0)	0.43	160 (65.5)	157 (64.3)	0.7
• Pray for them (NO)	28 (23.5)	45 (37.8)	0.004	34 (27.2)	47 (37.6)	0.042	62 (25.4)	92 (37.7)	<0.001
If you were to meet a person suffering from epilepsy, what advice would you give them or their family?									
• Go to the doctor or hospital (YES)	73 (61.3)	97 (81.5)	<0.001	61 (48.8)	88 (70.4)	<0.001	134 (54.9)	185 (75.8)	<0.001
• Take them to a traditional healer (NO)	92 (77.3)	94 (78.9)	0.73	90 (72.0)	96 (76.8)	0.33	182 (74.5)	190 (77.8)	0.35
• Go to church (NO)	47 (39.5)	76 (63.8)	<0.001	62 (49.6)	81 (64.8)	0.005	109 (44.6)	157 (64.3)	<0.001
• Wait for a second seizure/fit (NO)	111 (93.2)	112 (94.1)	0.76	111 (88.8)	111 (88.8)	0.9	222 (90.9)	223 (91.3)	0.86
• I don't know	3 (2.5)	0 (0.0)	0.13	16 (12.8)	4 (3.2)	0.001	19 (7.7)	4 (1.6)	<0.001
What would you do if you found out that one of your friends suffers from epilepsy?									
• Get closer to him/her in order to support him/her (YES)	55 (46.2)	74 (62.1)	0.002	81 (64.8)	74 (59.2)	0.29	136 (55.7)	148 (60.6)	0.1

• Find out more about epilepsy so you can help (YES)	77 (64.7)	76 (63.8)	0.88	71 (56.8)	77 (61.6)	0.33	148 (60.6)	153 (62.7)	0.5
• Advise them to go to the doctor (YES)	92 (77.3)	93 (78.1)	0.86	94 (75.2)	101 (80.8)	0.24	186 (76.2)	194 (79.5)	0.3
• Avoid any contact with him/her (NO)	92 (77.3)	84 (70.5)	0.13	97 (77.6)	104 (83.2)	0.17	189 (77.4)	188 (77.0)	0.8
• Advise people to avoid any contact with him/her (NO)	75 (63.0)	90 (75.6)	0.009	102 (81.6)	105 (84.0)	0.54	177 (72.5)	195 (79.9)	0.01
• Ask to be moved to another class (NO)	90 (75.6)	85 (71.4)	0.25	96 (76.8)	96 (76.8)	1	186 (76.2)	181 (74.1)	0.47
• Advise them not participate in sporting activities (NO)	77 (64.7)	74 (62.1)	0.61	77 (61.6)	69 (55.2)	0.15	154 (63.1)	143 (58.6)	0.17
If your brother or sister intended to marry a person who suffered from epilepsy, would you support him/her? (YES)	54 (45.4)	57 (47.9)	0.49	61 (48.8)	60 (48.0)	0.79	115 (47.1)	117 (48.0)	0.86
Do you think that a child suffering from epilepsy can go to school? (YES)	13 (10.9)	12 (10.1)	0.78	10 (8.0)	21 (16.8)	0.0241	23 (9.4)	35 (14.3)	0.064
What should we do to make epilepsy more visible and to help those who suffer from it?									
• Tell people that this disease can be treated (YES)	80 (67.2)	79 (66.3)	0.86	79 (63.2)	100 (80.0)	0.0007	159 (65.1)	179 (73.3)	0.02
• Encourage people to go to a doctor for treatment (YES)	61 (51.2)	73 (61.3)	0.06	68 (54.4)	74 (59.2)	0.38	129 (52.8)	147 (60.2)	0.05
• Use radio and television to raise awareness (YES)	44 (36.9)	42 (35.2)	0.74	53 (42.4)	44 (35.2)	0.1	97 (39.7)	86 (35.2)	0.2
• Do not exclude children with epilepsy from classes (YES)	31 (26.0)	36 (30.2)	0.41	44 (35.2)	64 (51.2)	0.003	75 (30.7)	100 (40.9)	0.006
• Use information booklets and books on epilepsy (YES)	80 (67.2)	74 (62.1)	0.33	65 (52.0)	73 (58.4)	0.21	145 (59.4)	147 (60.2)	0.8
• Make use of spiritual and community leaders to spread the correct information (YES)	56 (47.0)	56 (47.0)	1	44 (35.2)	44 (35.2)	1	100 (40.9)	100 (40.9)	1
• I don't know	3 (2.5)	4 (3.3)	0.7	1 (0.8)	2 (1.6)	1	4 (1.6)	6 (2.4)	0.5

¹ Mc Nemar test

Table 5 : perceived level of learning after reading the comic book.

Learning	Rural, N = 125 n (%)	Urban, N = 119 n (%)	p-value¹
A lot	71 (56.8)	91 (76.5)	0.004
Some things	20 (16.0)	10 (8.4)	
Not much	13 (10.4)	3 (2.5)	
Nothing	21 (16.8)	15 (12.6)	

¹ Fisher's exact test

Table 6 : level of appreciation of the comic book after reading it.

Level of appreciation	rural, N = 125 n (%)	urban, N = 119 n (%)	p-value¹
0 - not at all	15 (12.0)	11 (9.2)	0.800
1 – a little	4 (3.2)	3 (2.5)	
2 - moderately	16 (12.8)	17 (14.3)	
3 – a lot	23 (18.4)	28 (23.5)	
4 - enormously	67 (53.6)	60 (50.4)	

¹ Fisher's exact test