



An educational campaign about epilepsy among Italian primary school teachers. 2. The results of a focused training program



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ABSTRACT

A cohort of 582 Italian primary school teachers underwent a questionnaire survey to test their knowledge and attitudes toward epilepsy and verify whether an intensive and focused educational program could result in improvement of knowledge and attitudes. The program consisted of a presentation of the clinical manifestations of epilepsy and the distribution of informative brochures and an educational kit on the disease and its management to be used with their students. After several months, 317 teachers were retested using the same questions. Upon retest, the number of "don't know" answers decreased significantly for almost all questions. This was not the case for negative attitudes. The same holds true for teachers believing that epilepsy is a source of learning disability and social disadvantage. These findings support the beliefs that education on epilepsy is more likely to affect ignorance than prejudice and that stronger interventions are needed to counteract stigmatizing behaviors.

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1. Introduction

Epilepsy is one of the most common diseases encountered among schoolchildren [1]. As up to 40% of a child's waking life is spent at school,

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during that time, teachers have an important role in the surveillance and management of children with epilepsy. However, teachers do not receive any formal education on epilepsy. In Italy, our group investigated the knowledge and attitudes toward epilepsy among primary and secondary school teachers [2]. Teachers had, with some exceptions, a fairly satisfactory knowledge of epilepsy, its causes, outcome, and treatments, but they also had some negative attitudes. However, teachers attending disability courses and/or with more direct personal experience with children with epilepsy tended to have a more correct approach to the management of a seizure and, in general, were less likely to have discriminatory attitudes than the general public. For this reason, we thought that providing educational interventions to school teachers could facilitate the dissemination of correct knowledge and attitudes and ultimately improve the quality of life of children with epilepsy and their families.

To test the effects of an ad hoc educational intervention on epilepsy, a cohort of 582 Italian primary school teachers underwent a questionnaire survey on the knowledge and attitudes toward the disease. The results of the basic information on the disease in the same cohort have been published elsewhere [3]. The study had a twofold aim: (i) to verify with focused questions the background knowledge and attitudes of primary school teachers compared with other Italian primary and secondary school teachers [2] and the Italian population at large [4] and (ii) to impart a more intensive and focused educational program to the same cohort and verify whether the program could result in further improvement to be documented with the same set of questions of the previous survey. The first aim was accomplished in a separate publication [3] which showed that teachers were fully aware of the existence of epilepsy, most of them having direct experience with the disease. However, the knowledge of epilepsy in terms of frequency, causes, outcome, and response to the available treatments was still limited and did not seem to be affected by age, geographical distribution, duration of occupation, and direct experience with the disease. In this study, we aimed at assessing the added value (if any) of a training process in increasing awareness and improving the management of epilepsy.

2. Materials and methods

2.1. Study structure and population

The study was a nationwide cross-sectional survey entitled “What do you know about epilepsy?”. During the first stage, the LICE regional coordinators, one from each administrative district (or group of districts) of the entire national territory, were asked to identify a number of primary schools located in their district. The schools were chosen at random, but, within each district, the number was correlated with the size of the local population. Details of the first stage and the modalities of data collection are reported elsewhere [3].

2.2. The questionnaire

The questionnaire used for the interview was a structured form comprising 28 questions investigating three major issues: (A) general and specific knowledge about epilepsy (questions 1–9 and 15–19); (B) attitudes toward the social and individual implications of epilepsy (questions 10–14, 27, and 28); and (C) school life-related attitudes (questions 20–26). All the questions for the school teachers are detailed in Tables 1 and 2.

2.3. The “training” program

In the period of January–February 2013 after the first stage, the regional LICE coordinators had a meeting with all the teachers who participated in the survey. During this meeting, each coordinator made an educational presentation on the clinical manifestations of epilepsy, provided focused answers to any arising questions, and

Table 1

Demographics and teaching experience of teachers who did and did not participate in the second survey.

		N	With FU		p-Value
			n = 317	n = 265	
Sex	F	570	316 (99.7)	254 (95.8)	0.0017
	M	12	1 (0.3)	11 (4.2)	
Residency	North	250	125 (39.4)	125 (47.2)	<0.0001
	Center	168	131 (41.3)	37 (14.0)	
	South and islands	164	61 (19.2)	103 (38.9)	
Age	25–39 years	126	68 (21.5)	58 (21.9)	0.9858
	40–49 years	226	124 (39.1)	102 (38.5)	
	50+ years	230	125 (39.4)	105 (39.6)	
Years of teaching	1–9 years	92	51 (16.1)	41 (15.5)	0.0950
	10–19 years	187	101 (31.9)	86 (32.5)	
	20–29 years	165	79 (24.9)	86 (32.5)	
	30+ years	138	86 (27.1)	52 (19.6)	
Experience with children with disability	Yes	254	145 (45.7)	109 (41.1)	0.2642
Attended courses on disabilities	Yes	349	201 (63.4)	148 (55.8)	0.0639
Number of courses	0	233	116 (36.6)	117 (44.2)	0.1912
	1–3	215	129 (40.7)	86 (32.5)	
	4–9	86	46 (14.5)	40 (15.1)	
	10+	48	26 (8.2)	22 (8.3)	
2. Have you ever seen a seizure?	No	308	155 (48.9)	153 (57.8)	0.0334
	Yes	274	162 (51.1)	112 (42.3)	
15. Have you ever had children with epilepsy in your classroom?	Yes	277	156 (49.2)	121 (45.7)	0.6294
	No	297	156 (49.2)	141 (53.2)	
16. How often have you been informed by parents of the child's epilepsy?	Don't know	8	5 (1.6)	3 (1.1)	0.1983
	Yes	479	255 (80.4)	224 (84.5)	
	No	103	62 (19.6)	41 (15.5)	

distributed informative brochures entitled “Shedding light on epilepsy” to each teacher. Teachers also received an educational kit to be used with their students. The kit contained the following: (i) a folding on information on the general characteristics of epileptic seizures and epilepsy, with instructions on the hardship of disability; (ii) a fairy tale (published by the Italian chapter to disseminate knowledge about epilepsy in small children) to be distributed to each student; and (iii) a poster showing correct management of a tonic–clonic seizure. The poster had to be hanged in the classroom and its contents shared and discussed with the children. The material is accessible (in Italian) at the following links: http://www.lice.it/pdf/conoscere_epilessia.pdf; http://www.fondazionelice.it/Sara_e_le_sbiruline_di_Emily/index.html; and http://www.fondazionelice.it/pdf/poster_50x70.indd.pdf.

2.4. The retest

During the period of April–May 2013, the LICE coordinators returned back to the schools and retested teachers using the same questionnaire of stage 1. Teachers decided to participate in this second stage on a voluntary basis.

2.5. Statistical analysis

Descriptive statistics are reported as count and percentage. Differences between the retested and nonretested groups were assessed using the chi-square test or the Fisher exact test as appropriate. The change in the distribution of the responses at each question between t0 (the end of the first stage) and t1 (the end of the second stage) was assessed using the McNemar or the Friedman test as appropriate. The Friedman test was used for questions allowing for 3 or more responses, which were rescaled in an ordinal rank ranging from the most appropriate to the least appropriate. Answers requiring a “Yes” or a “No” response were categorized as “Correct” vs. “Incorrect” and used as dependent variables in multivariable repeated measures models.

Table 2
Questions and answers (before and after the training).

Question	Before n (%)	After n (%)	p-Value
4. How many people are affected by epilepsy?			
1/10	4 (1.3)	10 (3.2)	<0.0001
1/100	48 (15.1)	186 (58.7)	
1/1000	48 (15.1)	38 (12.0)	
1/10,000	12 (3.8)	13 (4.1)	
Don't know	205 (64.7)	70 (22.1)	
5. What do you think causes epilepsy?			
Hereditary disease	166 (52.4)	245 (77.3)	<0.0001
Birth defect	137 (43.2)	174 (54.9)	0.0008
Traumatic brain injury	115 (36.3)	207 (65.3)	<0.0001
Infection	42 (13.3)	121 (38.2)	<0.0001
Brain tumor	97 (30.6)	182 (57.4)	<0.0001
Psychological/psychiatric disease	30 (9.5)	18 (5.7)	0.0704
Don't know	82 (25.9)	21 (6.6)	<0.0001
6. What is the age of onset of epilepsy?			
Childhood	73 (23.1)	32 (10.1)	<0.0001*
Adult		1 (0.3)	
All ages	215 (68.0)	276 (87.3)	
Don't know	28 (8.9)	7 (2.2)	
ns	1	1	
7. Do you think epilepsy is a form of psychiatric disease?			
Yes	12 (3.8)	6 (1.9)	<0.0001
No	259 (82.0)	301 (95.3)	
Don't know	45 (14.2)	9 (2.9)	
ns	1	1	
8. Do you think epilepsy is treatable with:			
Specific drugs	295 (93.1)	312 (98.4)	0.0007
Surgery	55 (17.4)	168 (53.0)	<0.0001
Other	19 (6.0)	26 (8.2)	0.2498
Don't know	17 (5.4)	5 (1.6)	0.0073
9. Do you think epilepsy is a curable illness?			
Yes	98 (30.9)	204 (64.4)	<0.0001
No	102 (32.2)	84 (26.5)	
Don't know	117 (66.9)	29 (9.1)	
10. Do you think epilepsy limits marriage?			
Yes	2 (0.6)	5 (1.6)	0.0031
No	291 (91.8)	306 (96.5)	
Don't know	24 (7.6)	6 (1.9)	
11. Do you think epilepsy is a limit to having children?			
Yes	15 (4.7)	14 (4.4)	<0.0001
No	251 (79.2)	290 (91.5)	
Don't know	51 (16.1)	13 (4.1)	
12. Do you think epilepsy limits regular employment?			
Yes	98 (31.0)	66 (20.9)	<0.0001
No	174 (55.1)	232 (73.4)	
Don't know	44 (13.9)	18 (5.7)	
13. Do you think epilepsy limits driving?			
Yes	166 (52.4)	179 (56.5)	<0.0001
No	69 (21.8)	117 (36.9)	
Don't know	82 (25.9)	21 (6.6)	
14. Do you think epilepsy limits sports and recreational activities?			
Yes	102 (32.2)	144 (45.4)	0.0071
No	138 (43.5)	148 (46.7)	
Don't know	77 (24.3)	25 (7.9)	
17. Do you know how to manage a child experiencing an epileptic attack?			
Yes	169 (53.3)	269 (84.9)	<0.0001
No	99 (31.2)	31 (9.4)	
Don't know	49 (15.5)	17 (5.8)	
18. In the case of a seizure in class what do you do?			
Call an ambulance	159 (50.1)	179 (56.5)	0.0702
Have the child lie down on the ground and wait until the end of the attack	196 (61.8)	273 (86.1)	<0.0001
Place something in the child's mouth	85 (26.8)	19 (6.0)	<0.0001
Block the spasms of the limbs	20 (6.3)	7 (2.2)	0.0046
Administer medications endorectally	99 (31.2)	144 (45.4)	<0.0001
Don't know	37 (11.7)	6 (1.9)	<0.0001

Table 2 (continued)

Question	Before n (%)	After n (%)	p-Value
19. In your school are there difficulties in administering antiepileptic drugs during school hours?			
Yes	65 (20.6)	74 (23.5)	<0.0001**
No	114 (36.2)	147 (46.7)	
Don't know	136 (43.2)	94 (29.8)	
20. In your opinion, to what extent does epilepsy impair children's learning?			
Always	4 (1.3)	2 (0.6)	0.0041
Sometimes	170 (53.6)	188 (59.3)	
Never	72 (22.7)	102 (32.2)	
Don't know	71 (22.4)	25 (7.9)	
21. In your opinion, to what extent children with epilepsy require support in school?			
Always	20 (6.3)	9 (2.8)	<0.0001
Sometimes	157 (49.5)	189 (59.6)	
Never	77 (24.3)	92 (29.0)	
Don't know	63 (19.9)	27 (8.5)	
22. In your opinion, to what extent children with epilepsy have mental and/or behavior alterations?			
Always	6 (1.9)	2 (0.6)	<0.0001
Sometimes	168 (53.0)	201 (63.4)	
Never	60 (18.9)	85 (26.8)	
Don't know	83 (26.2)	29 (9.2)	
23. In your opinion to what extent antiepileptic drugs affect learning and behavior?			
Always	7 (2.2)	4 (1.3)	<0.0001
Sometimes	150 (47.3)	194 (61.2)	
Never	43 (13.6)	77 (24.3)	
Don't know	117 (36.9)	42 (13.3)	
24. In your opinion, to what extent children with epilepsy have relationship problems with their peers?			
Always	3 (1.0)	2 (0.6)	0.1522
Sometimes	165 (52.1)	175 (55.2)	
Never	109 (34.4)	120 (37.9)	
Don't know	40 (12.6)	20 (6.3)	
25. Compared to their classmates, how should children with epilepsy be treated with respect to attitudes and demands?			
Same	245 (77.3)	269 (84.9)	0.0042
Differentiated	38 (12.0)	37 (11.7)	
Don't know	34 (10.7)	11 (3.5)	
26. Based on your experience, how do classmates behave toward a child with epilepsy?			
Normally	133 (42.0)	165 (52.1)	0.0019***
Try to help	91 (28.7)	85 (26.8)	
Tend to marginalize	5 (1.6)	5 (1.6)	
Don't know	88 (27.8)	62 (19.6)	
27. In your experience, recreational and sport activities of a child with epilepsy must be:			
Normal	204 (64.8)	248 (78.7)	<0.0001
Limited	51 (16.2)	55 (17.5)	
Don't know	60 (19.1)	12 (3.8)	
28. Which of the following sports do you think should not be recommended for a child with epilepsy?			
Soccer	22 (6.9)	15 (4.7)	0.2087
Tennis	2 (0.6)	7 (2.2)	0.1797
Swimming	85 (26.9)	155 (49.1)	<0.0001
Skiing	53 (16.7)	83 (26.2)	0.0004
Athletics	4 (1.3)	6 (1.9)	0.7539
Boxing	118 (37.2)	211 (66.6)	<0.0001
Cycling	37 (11.7)	61 (19.2)	0.0063
Scuba diving	173 (54.6)	266 (83.9)	<0.0001
All	1 (0.3)	6 (1.9)	0.1250
Don't know	134 (42.3)	39 (12.3)	<0.0001

* McNemar p-value "all ages vs. others".
 ** McNemar p-value "don't know vs. others".
 *** McNemar p-value "don't know vs. others".

using the generalized estimating equations (GEEs) via the PROC GENMOD SAS procedure. These models were applied to the answers to questions 4, 5, 6, 7, 8, and 9; the composite of 10, 11, 12, and 13 (i.e., the combination of “No” responses vs. all other combinations); and 17 and 18. Questions 19 to 28 reflect opinions and experiences rather than factual knowledge and were excluded from this analysis. In the multivariable models, the effect of the training was adjusted by residency, age, years of teaching, experience with children with disability, attending courses on disability, having seen a seizure, and having had children with epilepsy in the classroom at t0. The results of the GEE models were reported as adjusted odds ratios (Adj. ORs) with 99.5% confidence intervals (CIs). Because of the exploratory nature of the study, we decided to not adjust the threshold of significance based on the amount of tests; however, we considered significant the p-values lower than 0.005 using two-tailed tests. All analyses were performed using the Statistical Analysis System version 9.2 (SAS Institute Inc., Cary, NC, USA).

3. Results

3.1. Differences between the retested and nonretested samples (Table 1)

Among the 582 teachers who participated in the first stage of the study, 317 (54.4%) were retested at t1. With one exception, retested teachers were only women. The retested sample included only 50% of teachers from Northern Italy, 80% from Central Italy, and 40% from Southern Italy ($p < 0.0001$). Age and years of teaching were similar in the retested and nonretested groups as was the proportion of teachers having experience with children with disability and/or attending courses on disabilities. Participants in the retest were slightly predominant among those witnessing a seizure (51% vs. 42%); however, this difference was considered nonsignificant ($p = 0.0334$). Furthermore, the two groups had similar experience with children with epilepsy in their classroom (49% vs. 46%).

3.2. The effect of training on the answers at stage 2 (t1) (Tables 2 and 3)

In the second stage survey, the “don’t know” answers dropped significantly, ranging from -30% (q. 26 “Based on your experience, how do classmates behave toward a child with epilepsy?”) to -84% (q. 18 “In the case of a seizure in class what do you do?”) with a median reduction

of 70%. Moreover, the proportion of teachers giving “correct” answers on the main disease characteristics increased significantly for almost all the questions of the survey. In the initial stage, only 48 (15.1%) teachers declared being aware of the correct prevalence of epilepsy; at t1 the number increased to 186 (58.7%); the proportion of teachers who are aware that epilepsy could initiate at all ages changed from 68% to 87.3%, and that of teachers believing epilepsy is not a psychiatric disorder increased from 82% to 95.3%. Except for psychiatric disorders, each putative cause was increasingly reported upon retest. Up to one-half of teachers became aware of surgery as a possible treatment (17.4% to 53%), and two-thirds of teachers knew that epilepsy is curable (vs. 30.9% during stage 1). Stigma toward epilepsy decreased significantly, and great differences were observed in the management of epileptic seizures. With few exceptions, the general attitudes regarding children with epilepsy in the school improved significantly but only to the extent of reducing the number of teachers who did not have a precise opinion on the coexistence of epilepsy with social life. These latter individuals tended to have attitudes changed to positive attitudes. This was not the case for those having negative attitudes toward epilepsy. The same holds true for teachers believing that children with epilepsy have relationship problems with their peers, should receive a differential management at school, and tend to be marginalized by classmates.

The longitudinal multivariate models on the proportion of correct/incorrect answers reported education as very effective (except for the questions “call the ambulance” and “block the spasms of the limbs”), with ORs (correct answer at t1 vs. correct answer at t0) ranging from 1.3 (0.9–1.9), for those who declared that in case of a seizure in the classroom they would not call the ambulance, to 8.7 (5.0–15.1), for those who were aware of the true prevalence (1/100) of epilepsy.

4. Discussion

The educational program on epilepsy directed to a sample of primary school teachers has been successful in improving knowledge toward the disease and, most importantly, in reducing the number of persons unaware of the burden of disease and its impact on daily life. There are few studies that reported the impact of educational programs on epilepsy knowledge and management, and only some of them were applied to school teachers. In Chandigarh, India, Goel and coworkers [5] used a “before-and-after” experimental design to test the effects of an intervention package on the knowledge and practices used by teachers to manage epileptic seizures. The package included audiovisual material on the basic aspects of epilepsy. After retesting, knowledge about epilepsy appeared significantly improved in all explored domains (nature and classification, underlying factors, clinical features, management, prevention, and general aspects). Attitudes (education and marriage) and skills in the management of hypothetical seizures were also significantly improved. The positive effects of intervention programs on the knowledge and attitudes toward epilepsy have also been confirmed among schoolchildren in Turkey [6], college students in Canada [7], other health professionals in Brazil [8], university students in the health area in Brazil [9, 10], and patients themselves and their families in rural China [11].

In our previous survey, 37% of primary and secondary school teachers believed that epilepsy starts only in childhood, 55% considered it hereditary, 46.8% considered it incurable, and only 10.5% knew that surgery is a therapeutic option [2]. The results were not dissimilar to those of the present pretest survey (52.4, 32.2, and 17.4%). However, the percentages were significantly modified at the end of the retest (77.3, 26.5, and 53.0%), reflecting the impact of the educational program.

With few exceptions, teachers in the present survey had mainly positive attitudes toward epilepsy, except toward driving, sports, and recreational activities. These findings compared favorably with the reports by teachers interviewed prior to the educational campaign [2] and with the knowledge and attitudes shown by the Italian population

Table 3
Multivariable generalized estimating equation (GEE) models.

Dependent variable		Adj. OR (99.5% CI)	p-Value
Prevalence of epilepsy: 1/100	t1 vs. t0	8.7 (5.0–15.1)	<0.0001
Do not place anything in the child's mouth	t1 vs. t0	6.0 (2.9–12.5)	<0.0001
I know how to manage a child seizure	t1 vs. t0	5.6 (3.3–9.5)	<0.0001
Epilepsy is treatable with surgery	t1 vs. t0	5.6 (3.4–9.3)	<0.0001
Epilepsy is treatable with drugs	t1 vs. t0	4.9 (1.2–19.9)	0.0015
Epilepsy is not a mental disorder	t1 vs. t0	4.6 (2.1–10.2)	<0.0001
Epilepsy could be caused by an infection	t1 vs. t0	4.3 (2.5–7.5)	<0.0001
Epilepsy is curable	t1 vs. t0	4.1 (2.7–6.4)	<0.0001
Lie the child down and wait until the end of the attack	t1 vs. t0	4.0 (2.3–6.9)	<0.0001
Epilepsy onset at all ages	t1 vs. t0	3.4 (2.0–5.7)	<0.0001
Epilepsy could be caused by a traumatic brain injury	t1 vs. t0	3.4 (2.3–5.0)	<0.0001
Epilepsy could be caused by a brain tumor	t1 vs. t0	3.3 (2.1–4.9)	<0.0001
Epilepsy could be hereditary	t1 vs. t0	3.2 (2.1–5.0)	<0.0001
Do not block the spasms of the limbs	t1 vs. t0	3.1 (1.0–9.5)	0.0058
Epilepsy does not limit marriage/procreation/work	t1 vs. t0	2.5 (1.5–3.9)	<0.0001
Administer medications endorectally	t1 vs. t0	1.9 (1.3–3.0)	<0.0001
Epilepsy could be caused by a birth defect	t1 vs. t0	1.6 (1.1–2.4)	0.0007
Do not call the ambulance	t1 vs. t0	1.3 (0.9–1.9)	0.0696

All models were adjusted by residency, age, years of teaching, experience with children with disability, attending courses on disability, to have ever seen a seizure, and to have ever had children with epilepsy in the classroom.

at large [4], suggesting that the nationwide educational campaign promoted by LICE was successful.

In general, teachers' attitudes resulted in further improvement after retest by reducing the number of those unable to answer (who moved to a positive attitude), but the number of interviewees showing negative attitudes remained substantially unchanged. As shown in Table 2, after retest, there was only a slight decrease in the number of teachers believing that epilepsy is incurable and limits employment, there was no change in the number of those believing that the disease limits procreation, and there was even a slight increase in the number of those considering the disease a limitation for sports and recreational activities. Likewise, there was no decrease in the number of teachers believing that epilepsy is a source of learning disability and social disadvantage. These findings support the belief that education on epilepsy is more likely to affect ignorance than prejudice.

The educational program was helpful in facilitating the correct management of a child during a seizure. However, no change was found in the number of teachers willing to call an ambulance. As no less than one-fifth of cases declared having difficulties in administering antiepileptic drugs during school hours, this attitude can be easily explained. At school, as in other community settings, each child during a seizure who requires rescue medication should have an individual health-care plan that clearly delineates the roles and responsibilities of all those who may be involved in the event of a seizure. In practice, this does not always happen [12]. Little published evidence exists on the experience of children who require rescue medication at school, but the situation is thought to vary between schools. Insights from epilepsy specialists suggest that schools often react with panic and fear when faced with a child having a prolonged convulsive seizure, and fear of liability is a major barrier to overcome.

Although after the educational program most teachers reported that epilepsy is no longer stigmatizing when performing sports and recreational activities, a higher perception of the risks associated with selected sports (swimming, skiing, boxing, and scuba diving) was found upon retest. The lack of official recommendations issued by both sports and epilepsy organizations offers an explanation for these conservative attitudes.

This survey has strengths and limitations. The major strength is represented by the extensive coverage of the Italian territory, which reflects the impact of the program on nationwide knowledge and attitudes toward epilepsy. The first and foremost limitation is the fairly low response rate (54%). Selection bias may be an issue because teachers willing to participate in retesting were perhaps those more likely to give knowledgeable and confident answers or those taking care of children with disability. However, with the exception of sex, residency, and, to some extent, having seen a seizure, teachers undergoing retest were fairly similar to the rest of the cohort in terms of demographics, teaching experience, and direct experience with children with epilepsy. A second limitation is the way several questions were structured, which may leave room to differing interpretations. A third limitation is the limited number of issues addressed by the entire interview. More specifically, we did not inquire the attitudes toward having contacts with people with epilepsy. The last limitation is the small sample undergoing retest, which limited subgroup comparisons.

In conclusion, our study confirms the efficacy of an ad hoc educational program on the basic knowledge of epilepsy and the management of an epileptic seizure among primary school teachers. However, this intervention did not contribute to decrease negative attitudes, suggesting that an educational program like ours is effective against

ignorance but is unlikely to modify prejudice. Additional, stronger interventions are, thus, needed against stigmatizing behaviors.

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Conflict of interest statement

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