

Original Article

Knowledge of Medical Students about Epilepsy: Need for a Change

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ABSTRACT

Purpose: Though most doctors in their professional life will provide care for people with epilepsy, many will not get further training in their professional life. There may be other barriers, perceived or not, to providing care to people living with epilepsy by doctors which need to be approached in the medical undergraduate curriculum and medical continuing education. The aim of this study was to determine the knowledge gaps of medical students on basic issues regarding epilepsy that could be useful in preparing training material for the students and continuous medical education for doctors working in the community. **Materials and Methods:** This cross-sectional and descriptive study was carried out in one of the medical schools in Enugu metropolis. Data collection was done using a semi-structured validated questionnaire. **Results:** Seizure was regarded as a movement disorder by 10.3% of the students. The rank of causes of epilepsy given by respondents was brain injury (88%), brain tumor (87%) genetics (62.3%), and strokes (55.1%). Significantly more students who did neurology posting correctly answered that stroke is a risk factor ($P < 0.001$), disagreed that sleep deprivation is a risk factor ($P = 0.04$), and recognized different seizure types ($P < 0.001-0.002$). The mean score was $17.8 \pm 2.3\%$ ($71.2 \pm 9.2\%$); significantly higher in those who did neurology posting. Students scored lowest on questions regarding risk factors and duration of treatment. **Conclusion:** The content of medical curriculum in Africa should emphasize not only the content of lectures on epilepsy but also the need for students to go through neurology posting during their training. The outcome would be both better knowledge and improved physician-patient relations.

KEYWORDS: Epilepsy, knowledge, medical students, Nigeria

Date of Acceptance:

27-Feb-2017

INTRODUCTION

Epilepsy is a common neurological disorder and one of the most prevalent disorders seen in general neurology clinics in south-east (SE) Nigeria.^[1-4] The prevalence of epilepsy in sub-Saharan Africa (SSA) places the disorder as a public health problem and reflects the high incidence of several treatable conditions that are complicated by epilepsy within the setting.^[2] Though most doctors in their professional life will provide care for people with epilepsy (PWE),^[5] most do not get further training in epilepsy,^[6] and hence may not feel comfortable in managing them. Some doctors consider their training in epilepsy care to be inadequate,^[5] and may not be able to diagnose epilepsy correctly or request for the appropriate investigations.^[6] In Laos,^[7] 59% of the doctors did not know when to stop antiepileptic drugs (AEDs), 43.8% knew at least one cause of epilepsy, 48.6% knew at least one differential

diagnosis, whereas 27.2% did not trust in modern treatment of epilepsy.

There may be other barriers, perceived or not, to providing care to PWE by generalists, and they need to be approached in the medical undergraduate curriculum and medical continuing education.^[8] Current medical curriculum and textbooks in Nigeria mirror Western standards and do not put proper emphasis on epilepsy as a public health problem. The understanding of the knowledge of medical students undergoing clinical postings regarding epilepsy and its treatment is relevant in the preparation of a new curriculum in medicine, and clinical neurology in particular. Improved knowledge of

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How to cite this article: Ezeala-Adikaibe BA, Okpara T, Ekenze OS, Onodugo O, Ezeala-Adikaibe NP, Nnaji T, et al. Knowledge of medical students about epilepsy: Need for a change. *Niger J Clin Pract* 2017;20:884-91.

Access this article online	
Quick Response Code:	Website: www.njcponline.com
	DOI: 10.4103/njcp.njcp_174_16

students will eventually lead to the reduction of the large treatment gap, which currently exists in the management of the condition. To the best of our knowledge, there are no studies on the knowledge of medical students regarding epilepsy in Nigeria.

Objectives

The major aim of this study was to determine the knowledge of medical students undergoing clinical postings on basic issues regarding epilepsy and its treatment to identify the gaps in knowledge that could be useful in preparing training material for the students. Related to this was the need to identify knowledge gaps that could constitute targets for continuous medical education for doctors working in the community, which could enhance quality of care to patients.

MATERIALS AND METHODS

This study was cross-sectional and descriptive in design. It was carried out among students of the University of Nigeria, Enugu Campus undergoing clinical postings at the University of Nigeria Teaching Hospital Enugu. Our set hypothesis was overall high levels of knowledge among the students, especially those who have passed through neurology a neurology unit (pediatric or adult clinic).

Data collection was by means of a semi-structured questionnaire consisting of 2 sections; a section on general information about the respondents' year in training, neurology posting, and witnessing a seizure in the past. The other section dealt with definition of epilepsy, risk factors, types of epilepsy, social issues, and treatment. The questionnaire was in English. Study duration was 2 weeks (August 1–13 2012).

We used questions with "TRUE" or "FALSE" options. The students were to answer all questions accordingly (max = 25): the questions were; (1) what is a seizure? (4); (2) what are the risk factors for epilepsy? (7); (3) types of seizures are (4); (4) how long should antiepileptic drugs be taken? (4); (5) what are the consequences of epilepsy? (2); and (6) the following are appropriate in the treatment of acute seizures (4). All the questionnaires were self-administered and the completed questionnaires were retrieved the same day. Data were assembled, tallied, put in frequency tables, and analyzed. Correct responses on knowledge were scored 1 and incorrect ones as 0. Scores were converted to percentages and categorized as follows: scores $\geq 80\%$ very high, 60–79% high, 50–59% low, and $< 50\%$ very low. Proportions were compared using the chi-square statistic. Mean scores of the respondents were compared using *t*-test statistic or

analysis of variance (ANOVA) with post hoc analysis where appropriate. In all the analyses, the level of significance was kept at < 0.05 .

RESULTS

All questionnaires were distributed and retrieved (100%) the same day. Most of the students were final year students (41.4%) and have not undergone any neurology posting at the time of the study (51.8%). Approximately 70% had witnessed a seizure in the past.

Definition and types of seizures

"Seizure is an abnormal electrical discharge in the brain" was considered by 94.5% of the respondents, whereas 10.3% thought it was a form of abnormal movement. Almost all rightly disagreed that epilepsy is a form of divine or demonic activity (99.7% and 97.3%, respectively) [Table 1]. The proportion of correct responses increased with number of years in training. There was no statistical difference between students who did neurological posting and those who did not on the questions in this category [Table 2].

Risk factors for epilepsy

The rank of causes of epilepsy given by respondents was brain injury (88%), brain tumor (87%), genetics (62.3%), and strokes (55.1%). More than half of the students accepted that sleep deprivation (53.4%) and high fever (56.5%) as risk factors [Table 1]. Significantly more students who did neurology posting correctly answered that stroke is a risk factor ($P < 0.001$). In contrast, more students who did not pass through a neurology clinic accepted that sleep deprivation is a risk factor ($P = 0.04$) [Table 2].

Types of seizures

Generalized tonic-clonic seizures (90.1%) were the most commonly recognized form of seizure whereas atonic seizure was the least (71.2%) [Table 1]. Significantly more students who did neurology posting recognized different seizure types than those who did not [Table 2].

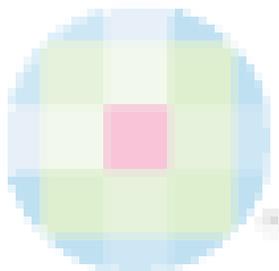
Treatment

A little more than half of students would treat epilepsy for life while only 26% would treat for approximately 2 years. Most of the patients, however, did not agree that epilepsy should be treated during an ictus only or 3–6 months [Table 1]. There was no statistical significant difference between the knowledge of students who did neurology posting and those who did not [Table 2].

More than half of the respondents (55.5%) would put an object inside the mouth, 11.3% would restrain the patient,

Table 1: Distribution of correct and incorrect answers

	Correct; n(%)	Incorrect; n(%)
1. What do you think a seizure is?		
[T] An abnormal electrical discharge in the brain	276(94.5)	16(5.5)
[F] A demonic attack	284(97.3)	8(2.7)
[F] Divine punishment	291(99.7)	1(0.3)
[F] An abnormal movement	262(89.7)	30(10.3)
2. What are the risk factors epilepsy?		
[T] A brain injury	257(88)	35(12)
[T] Brain tumor	254(87)	38(13)
[F] Sleep deprivation	202(69.2)	156(53.4)
[T] Heavy drinking	136(46.6)	90(30.8)
[T] Stroke	161(55.1)	131(44.9)
[T] Genetic disease	182(62.3)	110(37.7)
[F] High fever	127(43.5)	165(56.5)
3. What are the types of seizures?		
[T] GTCS	263(90.1)	29(9.9)
[T] Simple Partial Seizures	238(81.5)	54(18.5)
[T] Atonic Seizures	208(71.2)	84(28.8)
[T] Absence Seizures	232(79.5)	60(20.5)
4. How long should antiepileptic drugs be taken?		
[T] May be for life	162(55.5)	130(44.5)
[T] About 2 years	76(26)	216(74)
[F] Only during an episode	281(96.2)	11(3.8)
[F] For 3–6 months	265(90.8)	27(9.2)
5. What are the consequences of epilepsy?		
[F] Cannot get married or get pregnant	279(95.5)	13(4.5)
[F] Must quit work	282(96.6)	10(3.4)
6. What should be done during a seizure?		
[T] Place the person in a semi-prone position to prevent choking	168(57.5)	124(42.5)
[F] Place something in the mouth	130(44.5)	162(55.5)
[F] Restrain the person	259(88.7)	33(11.3)
[T] Prevent injury during the episode	246(84.6)	46(15.8)



and 52.7% would give antiepileptic drugs. Nevertheless, 84.6% would try to prevent injuries [Table 1]. There was a statistical significant difference between the number students who passed through neurology posting who would restrain their patients and those did not [Table 2].

Consequence of epilepsy

Most respondents (91–96.6%) disagreed that PWE cannot get married/get pregnant or quit their job. There was no statistical significant difference in this category between the knowledge of students who did neurology posting and those who did not Table 2.

Scores of knowledge

The mean scores in the 6 items are shown in [Table 3]. For each group of students, their mean scores are also

shown in Table 4. Overall, the average score was $17.8 \pm 2.3\%$ ($71.2 \pm 9.2\%$). The range of scores were; very high 69,(23.6%), high 188,(64.4%), low 31,(10.6%), and very low 4 (1.4%) [Table 3] and [Table 4]. Mean scores were significantly higher in older students, in those who had witnessed seizures, and those who did neurology posting. Students scored lowest on questions about risk factors duration of treatment [Table 3]. Students who did not advocate the use of herbal healing methods also had higher scores.

The proportion of students with very high levels of knowledge were almost two times more in those who did neurological posting and almost 3 times more in final year students than 4th year students.

Table 2: Distribution of correct answers in different groups of students

	4th year	5th year	6th year	Neuro posting	No Posting	P-value
1. What do you think a seizure is?						
[T] An abnormal electrical discharge in the brain	59(92.2)	101(94.4)	116(95.9)	131(92.3)	145(96.7)	0.098
[F] Demonic possession	64(100)	104(97.2)	116(95.9)	137(96.5)	147(98)	0.426
[F] Divine punishment	64(100)	106(99.1)	121(100)	141(99.3)	150(100)	0.303
[F] An abnormal movement	57(89.1)	98(91.6)	107(88.4)	129(90.8)	133(88.7)	0.540
2. What are the risk factors epilepsy?						
[T] Head injury	45(70.3)	95(88.8)	117(96.7)	129(90.8)	128(85.3)	0.147
[T] brain tumor	50(78.1)	92(86)	112(92.6)	128(90.1)	126(84)	0.119
[F] Sleep deprivation	52(81.2)	77(72)	73(60.3)	90(63.4)	112(74.1)	0.037*
[T] Heavy drinking	18(28.1)	46(43)	72(59.5)	74(52.1)	62(41.3)	0.065
[T] Stroke	20(31.2)	49(45.8)	92(76)	44(69)	63(42)	<0.001*
[T] Genetic disease	37(57.8)	63(58.9)	82(67.8)	88(62)	94(62.7)	0.093
[F] High fever	40(62.5)	107(36.6)	121(41.4)	60(47.2)	67(52.8)	0.678
3. What are the types of seizures?						
[T] GTCS	46(71.9)	99(92.5)	118(97.5)	136(95.8)	127(84.7)	0.002*
[T] Simple partial seizures	30(46.9)	93(86.9)	115(95)	129(90.8)	109(72.7)	<0.001*
[T] Atonic seizures	29(45.3)	71(66.4)	108(89.3)	115(81)	93(62)	<0.001*
[T] Absence seizures	27(42.2)	90(84.1)	115(95)	130(91.5)	102(68)	<0.001*
5. How long should antiepileptic drugs be taken?						
[T] May be for life	35(54.7)	45(44.5)	82(67.8)	82(57.7)	80(53.3)	0.448
[T] 2–5 years	10(15.6)	32(29.9)	34(28.1)	41(28.9)	35(23.3)	0.281
[F] Only during an episode	60(93.8)	103(96.3)	118(97.5)	139(97.9)	142(94.7)	0.149
[F] For 3–6 months	55(85.9)	93(86.9)	117(96.7)	133(93.7)	132(88)	0.095
6. What are the consequences of epilepsy?						
[F] Cannot get married or get pregnant	59(92.2)	104(97.2)	116(95.9)	136(95.8)	143(95.3)	0.855
[F] Must quit work	63(98.4)	101(94.4)	118(97.5)	140(98.6)	142(94.7)	0.065
7. What should be done during a seizure?						
[T] Place the person in a semi-prone position to prevent choking	36(56.2)	64(59.8)	68(56.2)	80(56.3)	88(58.7)	0.687
[F] Place something in the mouth	23(35.9)	55(51.4)	52(43)	61(43)	69(46)	0.601
[F] Restrain the person	52(81.2)	92(86)	115(95)	132(93)	127(84.7)	0.025*
[T] Prevent injury during the episode	43(67.2)	95(88.8)	108(89.3)	123(86)	123(82)	0.279

Table 3: Mean (SD) and range of scores of students in different questions

Variable	Range	Mean score (%)	Percentage
What do you think a seizure is?	2–4	3.8±0.4	95
What are the risk factors epilepsy?	1–6	3.4±0.9	56.7
What are the types of seizures?	0–4	3.2±1.2	80
How long should antiepileptic drugs be taken?	1–4	2.7±0.7	67.5
What are the consequences of epilepsy?	1–2	1.9±0.3	95
What should be done during a seizure?	0–4	2.8±14.2	70
Overall score	22–24	17.8±2.3	71.2

Table 4: Mean (SD) and range of scores of students in different questions.

	Mean score ± SD (P-value)	Very low	Low	High	Very High	Total (%)
Year in training						
4th	16.2±2.3	3(4.7)	16(25)	40(62.5)	5(7.8)	64(21.9)
5th	17.8±2.1	1(0.9)	10(9.3)	74(69.2)	22(20.6)	107(36.6)
6th	18.8±6.2(<0.001)*	-	5(4.1)	74(61.2)	42(34.7)	121(41.4)
Neurology posting						
Yes	18.5±1.7	-	8(5.6)	98(65.3)	25(16.7)	142(48.6)
No	17.2±0.2(<0.001)*	4(2.7)	23(15.3)	90(63.4)	44(31.0)	150(51.4)
Witnessed seizures						
Yes	18.2±2.2	2(1.0)	15(7.3)	127(62)	61(29.8)	205(70.2)
No	17±2.3(<0.001)*	2(2.3)	16(18.4)	61(70.1)	8(9.2)	87(29.8)
I advocate –						
- Herbal Medicine						
Yes	16.6±2.5	1(3.0)	8(24.3)	21(63.6)	3(4.3)	33(11.3)
No	17.9±2.2(0.01)*	3(1.2)	23(8.9)	167(64.5)	66(25.5)	259(88.7)
-Spiritual Healing						
Yes	17.8±2.4	1(1.1)	18(89.8)	54(61.4)	20(22.7)	93(31.8)
No	17.9±2.3(0.43)	3(1.5)	13(14.8)	134(65.7)	49(24.0)	199(68.2)
Total	17.8±8.5	4(1.4)	31(10.6)	188(64.4)	69(23.6)	292(100)

Table 5: Comparison of “YES” responses from students in Thailand and Enugu

	Enugu (Yes,%)	Thailand (Yes,%)
1. What do you think a seizure is?		
An abnormal electrical discharge in the brain	94.5	91.8
Demonic possession	2.7	0
An abnormal movement	10.3	15.5
2. What are the risk factors epilepsy?		
Head injury	88	74.5
Brain tumor	87	81.8
Sleep deprivation	53.4	7.3
Heavy drinking	46.6	30.9
Stroke	55.1	19.1
Genetic disease	62.3	50
High fever	56.5	67.3
3. What are the types of seizures?		
GTCS	90.1	95.5
Simple partial seizures	81.5	74.5
Atonic seizures	71.2	43.6
Absence seizures	79.5	33.6
4. How long should antiepileptic drugs be taken?		
May be lifelong	55.5	33.6
About 2 years	26	48.2
Only during an episode	3.8	13.6
3–6 months	9.2	4.5
5. What are the consequences of epilepsy?		
Cannot get pregnant	4.5	1.8
Must quit work	3.4	19.1

Contd...

Table 5: Contd...

	Enugu (Yes,%)	Thailand (Yes,%)
6. What should be done during a seizure?		
Place the person in a semi-prone position to prevent choking	57.5	61.8
Place something in the mouth	55.5	50.9
Restrain the person	11.3	20
Prevent injury during the episode	84.6	82.7

DISCUSSION

This study showed an overall high level of knowledge (71.2%) among medical students. The poorest scores were among 4th year students and those who advocated the use of herbal medicine for the treatment of epilepsy. Students who did neurology posting and those who witnessed seizures in the past also scored significantly higher than those who did not. Students' knowledge was lowest in the areas of risk factors and duration of treatment.

Most (94.5%) of the respondents knew that a seizure is due to an abnormal electrical discharge in the brain, and 3.1% thought it is as a result of some supernatural cause (demonic or divine punishment). In Thailand,^[9] a similar proportion knew that seizures are due to electrical activity, however, none attributed seizures to any form of spiritual activity. It is of concern that 10.3% believed that a seizure is an abnormal movement. Wrong definition of an epileptic seizure may affect both the type of treatment and commencement of treatment. Though partial seizures and myoclonic jerks may be mistaken for movement disorders, correct definition using basic clinical criteria for making diagnosis of seizures should be clearly taught to clinical students. This finding is less than 15.5% reported in Thailand [Table 5].^[9]

Regarding the risk factors for epilepsy, more than 87% correctly mentioned brain tumor and head injury as common risk factors. A smaller proportion accepted stroke (55.1%) and genetics (62.5%) to be risk factors of epilepsy. In a survey of medical practitioners, Sanya *et al.*^[6] found that the two most commonly mentioned risk factors were: genetic/hereditary (79%) and trauma (73%), a pattern different from our finding. In that study, less than 25% recognized brain tumor as a cause of epilepsy. These findings suggest the need to emphasize the risk factors during lectures and seminars. In fact, it is important to stress the fact that every brain disorder has the potential to cause epilepsy, and hence, the need for primary prevention. The proportion of students who indicated genetics as a risk factor for epilepsy is higher than findings from community and school knowledge and practice surveys in the same region.^[10,11] In SSA, epilepsy is often times regarded as a "family disease (genetic)," resulting in a high level of

stigma attached to the disorder.^[12] We presume that the answers given by these students were not a reflection of that of the general community. Our findings are similar to reports from Thailand^[9] and by Rahman.^[13] A survey of doctors in Laos found that 43.8% of doctors knew at least one cause of epilepsy.^[7]

Many students accepted that sleep deprivation and high fever are causes of epilepsy. It is possible these students, especially the 4th year students, could not differentiate between precipitating factors and risk factors of epilepsy. Students may also confuse febrile seizures (especially complex febrile seizures) with epilepsy. In Laos,^[7] 48.6% of doctors knew the differential diagnosis of epilepsy.

Knowledge of the classification of seizure types revealed that 90.1% of medical students recognized GTCs, whereas the least recognized seizure types were atonic and absence seizures. This finding is different from that found by Tiamakao in Thailand [Table 5].^[9] Apart from methodological differences, all the students involved in the present study were already in their clinical classes unlike those from Thailand.

Regarding the treatability of epilepsy, 96.2% did not agree that epilepsy should not be treated only during acute episodes. This is a welcome information, but must be viewed with caution as only 26% agreed that epilepsy may be treated for approximately 2 years. It is important for students to differentiate between an epileptic seizure from acute symptomatic seizures and eclampsia. The finding in this study is different from that from Thailand.^[9]

In Nigeria, epilepsy, as in many countries, is perceived as a manifestation of supernatural forces,^[14-18] hence, the suggestion that spiritual approaches and the use of herbal remedies are considered alternatives for epilepsy treatment.^[18,19] In this study, 11.3% and 31.8% of the participants endorsed traditional and spiritual healing approaches similar to a report from a community survey in the region.^[10] The endorsement of pluralistic approaches in the management of this disorder is not an undesirable virtue as espoused by medical experts who seek to engage the integration of healing methods; however, it may be an affirmation of misconceptions about epilepsy and has within it a negative help seeking implication hence the potential of further worsening the

epilepsy treatment gap. It is, therefore, the responsibility of medical educators and clinicians to educate the students on the appropriate first response in the treatment of seizures.^[11] The concept of spiritual healing in SSA is broad and may include prayer as a routine practice to solicit divine intervention to make orthodox medicine more effective and not necessarily the refusal of it. Students may take this understanding to the university. The proportion of students advocating spiritual and herbal healing methods attests to this assumption. *Vis-à-vis* the consequences of epilepsy, it is a welcome development that >95.5% disagreed that patients should not marry/get pregnant or quit their job. This finding is different from community based studies from the region.^[10,11]

Concerning emergency management of seizures, it is very surprising that 42.5% did not know that patients should be placed on the left lateral position and 44.5% will place objects in the mouth of patients. These findings are similar to reports from previous studies.^[8] The belief that objects should be placed inside the mouth or restrain a convulsing individuals is widespread in many societies, and communities and the view of these students definitely reflect these ideas.^[10,11,16-21]

The number of students who witnessed seizure in the past (70%) was less than 95% reported by a survey of doctors in Brazil,^[5] but more than 55% reported by Ab Rahman in Malaysia.^[13] Expectedly doctors are more likely to witness a seizure as part of their working experiencing while medical students are more likely to witness seizures than student in other fields. Students who had witnessed seizures had higher level of knowledge. Being an academic environment, witnessing a seizure offer students firsthand experience on the emergency management of seizures and may prompt them to ask questions. Furthermore, clinical training is usually centered on medical cases available during rounds hence such students are likely to learn more.

Overall, older students did better which can easily be attributed to both training and experience. Though this trend may suggests a positive impact of clinical training and lectures on the knowledge of epilepsy, it does not reflect to what extent and how fast it occurs. It is however debatable if students retain their knowledge long after leaving school as evidenced by the fact that most doctors show low levels of knowledge.^[6,7] Students who passed through neurology units during their posting were significantly more in recognizing seizures types, stroke as a risk factor, and sleep deprivation as not being a risk of epilepsy. These facts suggest the need for such postings at least once during their training. It is, however, difficult to explain why significantly more students who did neurology posting would restrain patients during convulsion. The knowledge scores included

6 items and the mean score was approximately 71.2% more than 60% found in Thailand.^[8] Knowledge about “What is a seizure” and the consequences of epilepsy achieved the highest scores (95%), whereas knowledge scores about the risk factors and treatment had the lowest scores of 56.7% and 65.5%, respectively. Our report is similar to that from Thailand in several knowledge questions and different from others [Table 5].^[9]

LIMITATIONS

The limitations of this study should be considered in the interpretation of our findings.

This study is a cross-sectional study, and therefore, the associations between variables described may not necessarily be causal or explain the change of knowledge over time, especially at the time of graduation. Some questionnaires were completed in front of the interviewers or together with fellow students. There is a possibility that this might have affected the responses given by the participants. However, due explanations were provided to the students that only their spontaneous responses were required and that answers will not be used to access them academically. Despite these limitations, one of the benefits of this study is that it has helped to provide a set of findings that could be considered as baseline for comparison with future studies and a basis to effect needed change in the content of neurology lectures in general and epilepsy in particular. Furthermore, this report emphasizes the need for neurology posting for students at least once in the period of their training. This study is important for policy makers and key opinion leaders in curriculum preparation.

CONCLUSION

The present study demonstrated that knowledge of epilepsy among medical students was incomplete and pinpointed areas needing redress. The content of medical curriculum in Africa should emphasize not only on the content of lectures on epilepsy but the need for students to undergo neurology posting in the course of their training. The outcome would be both better knowledge and improved physician–patient relationship.

Financial source of support

None.

Conflicts of interest

There are no conflicts of interest.

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