ORIGINAL RESEARCH

Epilepsy: Knowledge, Attitude, and Practice Among Secondary School Teachers in Khartoum State

Mohamed A. Elhassan · Amr A. Alemairy · Zeinab M. Amara ·

Abdrahman A. Hamadelneel · Abbasher H. Mohamed · Ahmed A. Elaimeri

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ABSTRACT

Introduction: Epilepsy is a continuing tendency to have seizures, i.e., a convulsion or any transient abnormal event resulting from paroxysmal cerebral neurons discharge, even if the attacks are separated by long intervals. Eighty-nine percent of the global burden of epilepsy is in developing countries. Knowledge about the disease is the cornerstone for its treatment and prevention.

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M. A. Elhassan · A. A. Alemairy (✉) · Z. M. Amara
Faculty of Medicine, University of Khartoum,
Khartoum, Sudan
e-mail: dramr2@hotmail.com

A. A. Hamadelneel
Ministry of Health, Khartoum, Sudan

A. H. Mohamed
Department of Internal Medicine, Faculty of
Medicine, University of Khartoum, Khartoum,
Sudan

A. A. Elaimeri
Faculty of Medicine, University of Gezira, Gezira,
Sudan

Objectives: The aim of this study was to assess knowledge, attitude, and practice of secondary school teachers toward epilepsy in Khartoum state, Sudan.

Method: A 38-item structured close ended questionnaire was self-administered to 317 secondary school teachers in Khartoum state, Sudan.

Results: The majority of the teachers knew about the term “epilepsy” (93.6%) and had witnessed an epileptic seizure (83.5%). But their knowledge about the etiology and treatment is generally poor: 48% believe that epileptic patients should not be treated normally in the community; 12.9% would tie and 47.6% would put a spoon in the mouth of the seizing patient.

Conclusion: There is a relatively low level of knowledge, especially about treatment and whether the disease is curable or not. Also there is misconception about the etiology and treatment by traditional means in spite of the high educational level. There is a high level of negative attitude toward epileptic patients, especially in dealing with them as normal people who can live their lives, get married, and work in areas that suit them. There is a good level of positive practice toward epileptic seizures and their first aid measures, but there is also a high level of negative practice that can harm patients like tying them and putting a spoon in their mouths.

Keywords: Attitude; Epilepsy; Knowledge; Practice; Seizure; Teachers

INTRODUCTION

Seizures and epilepsy are not the same. An epileptic seizure is a transient occurrence of signs and/or symptoms due to abnormal excessive or synchronous neuronal activity in the brain [1]. Practically, epilepsy is defined as having two occasions of unprovoked seizures more than 24 h apart [2]. For a long period of time, people with epilepsy have faced religious and cultural taboos that affect the type of care and treatment they need [3].

Worldwide at least 50 million people live with epilepsy [4]. Eight-nine percent of the epilepsy burden is in developing countries, and 5–10 per 1000 people in developing countries are reported to have active epilepsy [5]. In a hospital-based study from Qatar, an incidence of 174 per 100,000 persons was reported; in Sudan, the majority of epileptic seizures are probably caused by focal brain lesions; the prevalence ranged between 0.9/1000 in Sudan and 6.5/1000 in Saudi Arabia, with a median of 2.3/1000; thus, approximately 724,500 people in the Arab world live with epilepsy [6].

Wrong attitudes and practices toward epileptic patients can cause harm. Stabilizing patients by force may cause fractures and other complications. These practices are done as a result of a lack of adequate knowledge about dealing with epileptic patients.

School children are one of the groups affected by epilepsy and the negative attitude toward them can lead—in addition to physical injuries—to social isolation and learning difficulties that complicate the case even more. In Sudan, school children are not thoroughly medically checked and epileptic students are not grouped separately.

The objective of this study is to assess the knowledge, attitudes, and practices of secondary school teachers toward epilepsy in Khartoum state.

METHODS

This was a cross-sectional, descriptive study based on a facility (secondary schools). It was conducted in 2016 in Khartoum state, Sudan

which has seven localities: Khartoum, Jabal Awlea, Omdurman, Karari, Ombadda, Bahri, and Sharg Alniel. Sampling was based on these localities.

Assuming a prevalence of 50% of teachers having inadequate knowledge, attitude, and practice, one can calculate the sample size as follows:

$$n = \frac{z^2 pq}{d^2}$$

where Z is 1.96 (95% CI), p is the prevalence (0.5), $q = 1 - p$ (0.5), d is the margin of error (0.05), and the sample size = 384 teachers.

The type of sampling is cluster random sampling by dividing the state into seven clusters (localities); then three clusters were selected by simple random sampling. In each of the three chosen localities, more than 100 teachers were interviewed. The total number of teachers interviewed was 317 because 67 teachers refused to take part in this study.

Data was collected through self-administered questionnaires. The questionnaire was validated by the Department of Community Medicine, University of Khartoum which involved a statistician, social worker, and public health professor; also some local neurological professors of the university revised the informative values of the questionnaire's questions and their applicability to Sudanese people generally and school teachers specifically. Cronbach's alpha was found to be 0.83.

Study variables were age, gender, education level, duration of teaching, knowledge questions, attitude questions, and practice questions.

Data was analyzed using IBM SPSS (Statistical Package for Social Science) software (version 22) to calculate frequencies, Pearson chi-square test, and one-way ANOVA test.

Ethics

Consent was given from the Department of Community Medicine, University of Khartoum, Ministry of Education in Khartoum state, and from local education offices at Khartoum localities (clusters).

Table 1 Sociodemographic characteristics of participants ($n = 317$)

Sociodemographic characteristic	Number	Percentage
Age (years)		
15–30	26	8.2
31–45	75	23.7
46–60	113	35.6
≥ 61	103	32.5
Gender		
Male	167	52.7
Female	150	47.3
Educational level		
Secondary school	8	2.5
Graduate	163	51.4
Postgraduate	125	39.4
Non-response	21	6.6
Experience in teaching		
0–10	85	26.8
11–20	118	37.2
21–30	87	27.4
≥ 31	27	8.5

Fig. 1 Teachers' knowledge about the etiology of epilepsy ($n = 317$)

Verbal consent was taken from school administrators and teachers who participate in the study.

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1964, as revised in 2013. Informed consent was obtained from all patients for being included in the study.

RESULTS

A total of 317 secondary school teachers in Khartoum state, Sudan were interviewed and their sociodemographic data is shown in Table 1. Of the respondents, 167 (52.7%) were male teachers, 113 (35.6%) were aged between 46 and 60 years, 118 (37.2%) had between 11 and 20 years of teaching experience, and 163 (51.4%), i.e., the majority, had only a bachelor's degree in teaching.

A total of 294 (92.7%) teachers who had heard about epilepsy and 188 (59.3%) had taught at least one student with epilepsy. A total of 263 (83%) witnessed someone having an epileptic episode and 95 (30%) had at least one relative with epilepsy. Most of the teachers, 245 (77.3%), believe in the neurological etiology as a cause of epilepsy; however, 68 (21.5%) reported the devil and superstitious causalities and 136 (42.9%) related the cause to other organic diseases (Fig. 1). There were 27 (8.5%) who believed in traditional herbal treatment.

The scores of knowledge were scaled from 0 to 14 according to the above and other questions, and the levels were ranked as follows: optimum, 12–14; good, 9–11; intermediate, 7–8; poor, 4–6; and extremely poor, 0–3. Tables 2, 3, 4, and 5 show the results as a function of the sociodemographic statuses (tested by Pearson chi-square).

Seventeen (10%) male teachers had an optimum knowledge and none of the female teachers did. Knowledge scores are significantly different among male and female teachers. Knowledge scores are not significantly different among the teachers' age. Nearly one-third of the teachers had an intermediate knowledge score regardless of their age. Fourteen (8.6%) of the teachers who hold just a bachelor's degree had an optimum knowledge score, but those

Table 2 Knowledge score and teachers' gender ($n = 317$)

Gender	Knowledge score					Total
	Extremely poor	Poor	Intermediate	Good	Optimum	
Male	6 (1.6%)	24 (7.6%)	48 (15.1%)	72 (22.7%)	17 (5.4%)	167 (52.7%)
Female	6 (1.6%)	38 (12.0%)	50 (15.8%)	56 (17.7%)	0 (0%)	150 (47.3%)
Total	12 (3.8%)	62 (19.6%)	98 (30.9%)	128 (40.4%)	17 (5.4%)	317 (100%)

 $P = 0.00$ **Table 3** Knowledge score and teachers' age ranges ($n = 317$)

Age	Knowledge score				Total
	Extremely poor	Poor	Intermediate	Good	
15–30	0 (0%)	9 (2.8%)	9 (2.8%)	8 (2.5%)	26 (8.2%)
31–45	0 (0%)	15 (4.7%)	27 (8.5%)	30 (9.5%)	75 (23.7%)
46–60	3 (0.9%)	21 (6.6%)	30 (9.5%)	53 (16.7%)	113 (35.6%)
> 60	9 (2.8%)	17 (5.4%)	32 (10.1%)	37 (11.7%)	103 (32.5%)
Total	12 (3.8%)	62 (19.6%)	98 (30.9%)	128 (40.4%)	317 (100%)

 $P = 0.09$

Table 4 Knowledge score and teachers' educational levels ($n = 296$)

Educational level	Knowledge score					Total
	Extremely poor	Poor	Intermediate	Good	Optimum	
Secondary school	0 (0%)	0 (0%)	3 (1.0%)	5 (1.7%)	0 (0.0%)	8 (2.7%)
Graduate	3 (1.0%)	32 (10.8%)	53 (17.9%)	61 (20.6%)	14 (4.7%)	163 (55.1%)
Postgraduate	6 (2.0%)	27 (9.1%)	33 (11.1%)	59 (19.9%)	0 (0%)	125 (42.2%)
Total	9 (3.0%)	59 (19.9%)	89 (30.1%)	125 (42.2%)	14 (4.7%)	296 (100%)

 $P = 0.01$ **Table 5** Knowledge score and teachers' teaching experience ($n = 317$)

Teaching experience	Knowledge score					Total
	Extremely poor	Poor	Intermediate	Good	Optimum	
0–10	0 (0%)	12 (3.8%)	42 (13.2%)	31 (9.8%)	0 (0%)	85 (26.8%)
11–20	3 (0.9%)	27 (8.5%)	26 (8.2%)	53 (16.7%)	9 (2.8%)	118 (37.2%)
31–40	6 (1.9%)	11 (3.5%)	27 (8.5%)	38 (12.0%)	5 (1.6%)	87 (27.4%)
> 40	3 (0.9%)	12 (3.8%)	3 (0.9%)	6 (1.9%)	3 (0.9%)	27 (8.5%)
Total	12 (3.8%)	62 (19.6%)	98 (30.9%)	128 (40.4%)	17 (5.4%)	317 (100%)

 $P = 0.00$ **Table 6** Attitude score and teachers' gender ($n = 317$)

Gender	Attitude score			Total
	Bad	Intermediate	Good	
Male	54 (17.0%)	58 (18.3%)	55 (17.4%)	167 (52.7%)
Female	80 (25.2%)	43 (13.6%)	27 (8.5%)	150 (47.3%)
Total	134 (42.3%)	101 (31.9%)	82 (25.9%)	317 (100%)

 $P = 0.00$

with just a secondary school qualification or those with even postgraduate education did. Knowledge scores are significantly different among the teachers' educational level. None of the teachers with 0–10 years of experience had an extremely poor knowledge score, but 6 (6.8%) of those with 31–40 years of experience had that score. Knowledge scores are significantly different among the teachers' years of experience. The overall mean score of knowledge is 8.1 ± 2.3 SD which is considered intermediate.

Only 165 (52.1%) of the participants believe in treating epileptic patients as normal people, 22 (6.5%) think that epileptic patients can not get married, and only 141 (44.5%) believe that epileptic patients could work as farmers and shepherds; 113 (35.6%) would prevent their children from playing football if they had the disease, 169 (53.3%) would prevent them from swimming, and 147 (46.4%) would prevent them from riding bicycles.

The attitude scores were determined on a 0–8 scale according to the above and other

Table 7 Attitude score and teachers' age ranges ($n = 317$)

Age	Attitude score			Total
	Bad	Intermediate	Good	
15–30	14 (4.4%)	3 (0.9%)	9 (2.8%)	26 (8.2%)
31–45	27 (8.5%)	33 (10.4%)	15 (4.7%)	75 (23.7%)
46–60	48 (15.1%)	26 (8.2%)	39 (12.3%)	113 (35.6%)
> 60	45 (14.2%)	39 (12.3%)	19 (6.0%)	103 (32.5%)
Total	134 (42.3%)	101 (31.9%)	82 (25.9%)	317 (100%)

 $P = 0.03$ **Table 8** Attitude score and teachers' educational levels ($n = 296$)

Educational level	Attitude score			Total
	Bad	Intermediate	Good	
Secondary school	3 (1.0%)	3 (1.0%)	2 (0.7%)	8 (2.7%)
Graduate	60 (20.3%)	59 (19.9%)	44 (14.9%)	163 (55.1%)
Postgraduate	59 (19.9%)	36 (12.2%)	30 (10.1%)	125 (42.2%)
Total	122 (41.2%)	98 (33.1%)	76 (25.7%)	296 (100%)

 $P = 0.49$ **Table 9** Attitude score and teachers' teaching experience ($n = 317$)

Teaching experience	Attitude score			Total
	Bad	Intermediate	Good	
0–10	29 (9.1%)	30 (9.5%)	26 (8.2%)	85 (26.8%)
11–20	51 (16.1%)	43 (13.6%)	24 (7.6%)	118 (37.2%)
31–40	39 (12.3%)	22 (6.9%)	26 (8.2%)	87 (27.4%)
> 40	15 (4.7%)	6 (1.6%)	6 (1.6%)	27 (8.5%)
Total	134 (42.3%)	101 (31.9%)	82 (25.9%)	317 (100%)

 $P = 0.20$

questions, and the levels were ranked as follows: good, 7–8; intermediate, 4–6; and bad, 0–3. Tables 6, 7, 8, and 9 show the results as a function of the sociodemographic statuses (tested by Pearson chi-square).

Eighty (53%) of the female teachers had a bad attitude score and 54 (32.3%) of the male teachers had a bad score. Attitude scores are

significantly different among the female and male teachers. Thirty-nine (34.5%) of the teachers aged 46–60 had a good attitude score while 45 (43.6%) of those aged over 60 had a bad score. Attitude scores are significantly different among the teachers' ages. Attitude scores are not significantly different among the teachers' educational level or years of

Table 10 Practice score and teachers' gender ($n = 317$)

Gender	Practice score					Total
	Extremely inadequate	Inadequate	Intermediate	Good	Optimum	
Male	39 (12.3%)	35 (11.0%)	38 (12.0%)	49 (15.5%)	6 (1.9%)	167 (52.7%)
Female	30 (9.5%)	17 (5.4%)	29 (9.1%)	62 (19.6%)	12 (3.8%)	150 (47.3%)
Total	69 (21.8%)	52 (16.4%)	67 (21.1%)	111 (35.0%)	18 (5.7%)	317 (100%)

 $P = 0.02$ **Table 11** Practice score and teachers' age ranges ($n = 317$)

Age	Practice score					Total
	Extremely inadequate	Inadequate	Intermediate	Good	Optimum	
15–30	2 (0.6%)	3 (0.9%)	3 (0.9%)	12 (3.8%)	6 (1.9%)	26 (8.2%)
31–45	15 (4.7%)	15 (4.7%)	12 (3.8%)	30 (9.5%)	3 (0.9%)	75 (23.7%)
46–60	30 (9.5%)	15 (4.7%)	24 (7.6%)	38 (12.0%)	6 (1.9%)	113 (35.6%)
> 60	22 (6.9%)	19 (6.0%)	28 (8.8%)	31 (9.8%)	3 (0.9%)	103 (32.5%)
Total	69 (21.8%)	52 (16.4%)	67 (21.1%)	111 (35.0%)	18 (5.7%)	317 (100%)

 $P = 0.01$ **Table 12** Practice score and teachers' educational levels ($n = 296$)

Education level	Practice score					Total
	Extremely inadequate	Inadequate	Intermediate	Good	Optimum	
Secondary school	0 (0.0%)	3 (1.0%)	0 (0.0%)	5 (1.7%)	0 (0.0%)	8 (2.7%)
Graduate	22 (7.4%)	31 (10.5%)	37 (12.5%)	64 (21.6%)	9 (3.0%)	163 (55.1%)
Postgraduate	44 (14.9%)	12 (4.1%)	27 (9.1%)	36 (12.2%)	6 (2.0%)	125 (42.2%)
Total	66 (22.3%)	46 (15.5%)	64 (21.6%)	105 (35.5%)	15 (5.1%)	296 (100%)

 $P = 0.00$

experience. The mean score of attitude was 3.8 ± 2 SD. This score is considered bad.

Only 19 (6%) of the teachers had received first aid training regarding an epileptic seizure episode. Forty-one (12.9%) would tie and 151 (47.6%) would put a spoon in the mouth of the seizing patient. The majority of the teachers would do the following to the seizing patient: 242 (76.3%) would put him on the ground

carefully, 248 (78.2%) would remove any harmful surroundings, 177 (55.8%) would put a soft pillow under the seizing patient's head, and 197 (62.1%) would remove any tight clothes.

A total of 146 (46.1%) of the teacher said they would report the timing of an epileptic patient seizure episode and exactly what the patient did. Teachers responded that they would call for an ambulance in the following

Table 13 Practice score and teachers' teaching experience ($n = 317$)

Teaching experience	Practice score					Total
	Extremely inadequate	Inadequate	Intermediate	Good	Optimum	
0–10	17 (5.4%)	12 (3.8%)	9 (2.8%)	38 (12.0%)	9 (2.8%)	85 (26.8%)
11–20	21 (6.6%)	26 (8.2%)	18 (5.7%)	50 (15.8%)	3 (0.9%)	118 (37.2%)
31–40	22 (6.9%)	11 (3.5%)	31 (9.8%)	17 (5.4%)	6 (1.9%)	87 (27.4%)
> 40	9 (2.8%)	3 (0.9%)	9 (2.8%)	6 (1.9%)	0 (0.0%)	27 (8.5%)
Total	69 (21.8%)	52 (16.4%)	67 (21.1%)	111 (35.0%)	18 (5.7%)	317 (100%)

$P = 0.00$

situations: 167 (52.7%) if the seizure lasted longer than 5 min, 199 (62.8%) if the patient had already been diagnosed with chronic diseases such as diabetes or blood hypertension, 154 (48.6%) if that episode was the first for the patient, and 198 (62.5%) if the patient was swimming.

The practice scores were determined on a 0–12 scale according to the above and other questions, and the levels were ranked as follows: optimum, 11–12; good, 8–10; intermediate, 6–7; inadequate, 3–5; and extremely inadequate, 0–2. Tables 10, 11, 12, and 13 show the results as a function of the sociodemographic statuses (tested by Pearson chi-square).

Thirty-six (23.4%) male teachers had an extremely inadequate practice score while 62 (41.3%) of the female teachers had a good practice score. Practice scores are significantly different among the male and female teachers. Six (23.1%) of the teachers aged 15–30 had an optimum score while just 3 (2.9%) of those aged over 60 had that score. Practice scores are significantly different among the teachers' ages. Practice scores are significantly different among the teachers' educational level and years of experience. The mean score of practice was found to be 6.2 ± 3.3 SD. This score is considered low intermediate.

DISCUSSION

Teachers are an important group in every community as they contribute to raising new generations. The knowledge about epilepsy would

be transmitted to students, thereby increasing their awareness which will be reflected back to other groups in the community.

The results of the questions about familiarity with epilepsy were as follows: the majority of teachers (90%) knew about epilepsy as a disease which is slightly lower than in a study conducted in teachers in Pakistan (99%) [7] and higher than in studies conducted in Nigerian (84.8%) [8] and neighboring Ethiopian (90%) [9] teachers. Two-thirds (59%) have taught students who had epilepsy, which is very high compared to studies conducted in Egypt (10.6%) [10], India (12%) [11], Nigeria (23.2%) [12], Ethiopia [9], and Thailand (34%) [13], and the majority had witnessed someone in epileptic seizure.

In comparison with a study [14] in Gezira state, central Sudan, the high numbers of relatives or students with epilepsy in our study may be attributed to the increased population of the capital city (Khartoum). The high number of teachers who witnessed patients in an epileptic seizure indicates the real need for health education about first aid.

About the cause of epilepsy, the knowledge level was acceptable; 78% said it is a neurological problem compared with 53.3% in Ethiopia [9], 55% in Pakistan [7], and 57.4% in Nepal [15]. But there are still some teachers (21.1%) who related it to devils, compared to 26% of Nigerian teachers [8]. Actually 10% of Sudanese doctors believe in evil spirits as a possible cause of epilepsy [16].

About treatment, only 38.7% knew that there is a treatment for epilepsy, compared to

60% in Ethiopia [9]. Lack of knowledge about the treatment will affect the attitude toward affected students. In addition, it may also affect the compliance.

In the question about traditional medicine, 9.4% think that traditional medicine can treat epilepsy while 51% think it can not. This is good percentage in contrast to a study in northwestern Nigeria [17] which shows that 44.5% prefer traditional medicine for treating epilepsy.

The attitude toward epileptic patients is an important aspect that can affect the quality of patients' lives in many ways, especially socially and economically. Only 53.8% deal with epileptic patients as normal people, 64.2% think that an epileptic patient can get married and have children, and 46.2% think that an epileptic patient can do daily activities and work as a farmer or shepherd. These results indicate a relatively better attitude than expected toward epileptic patients that will help in decreasing the stigma that surrounds epileptic patients and makes them avoid being diagnosed and treated. Also denial of having epilepsy can make epileptic patients dangerous to the community, e.g., by driving cars on the road which should be prohibited. Similar positive attitude results were found in studies conducted on teachers in Saudi Arabia [18], Iran [19], and Turkey [20].

A total of 14.2% said they would tie the patient compared to 28.3% in study in Rwanda [21], and 49.5% would put a spoon in the mouth of the patient, the latter figure being very close to that in a study in southeast Nigeria [22]. These two negative measures can harm the patient by causing bone or teeth fractures or can harm the first aider himself. A high percentage of participants answered "don't know" (33%), which may show the need for more work in health education about the first aid of this disease. Generally there is an acceptable level of practice toward first aid of an epileptic seizure patient.

Male teachers have significantly better knowledge and attitude score, but female teachers have a better practice score (P values are 0.01, 0.00, and 0.01 by one-way ANOVA test). This could be because women tend to be

more gentle such that they would not put a spoon in the mouth of a seizing patient and they would quickly call for an ambulance. But on the other hand, women tend to believe more in devils and other superstitions.

Educational level of the teachers does not seem to affect knowledge, nor attitude, nor practice; this may show the total lack of Sudan's educational system regarding epilepsy and its first aid, and all the teachers' knowledge and practices are acquired personally. These results also support the other results in which the less experienced the teachers are, the better their knowledge, attitude, and practice are because younger teachers tend to be more open and use modern technology more frequently from where they get their knowledge about epilepsy.

This study has some limitations. First, the use of a close ended questionnaire does not allow for further details about of the reasons of some inadequate knowledge and practices. A further limitation is that this study addressed only secondary school teachers. Another limitation is that Sudanese people do not tend to disclose their educational level, e.g., 21 teachers did answer this question.

CONCLUSION

This study concludes that there is a relatively low level of knowledge, especially regarding knowledge about treatment and whether the disease is treatable or not. There is a high level of negative attitude toward epileptic patients, especially in dealing with them as normal people who can live their lives, get married, and work in areas that suit them.

There is a good level of positive practice toward epileptic seizures and their first aid measures, but also considerable negative practices that can harm the patient such as tying them and putting a spoon in their mouths.

Male teachers have a better knowledge and attitude, but female teachers have a better practice score.

Educational level and teaching experience do not affect the teachers' knowledge, attitude, and practice; all of their knowledge about epilepsy is acquired personally.

We recommend that more health education programs and campaigns about epilepsy should be done in coordination with the Ministry of Education. In addition, first aid training in general should be mandatory before the teachers get licensed, and this should be renewed every year or two to keep them updated about the new guidelines and measures.

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Compliance with Ethics Guidelines. All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1964, as revised in 2013. Informed consent was obtained from all patients for being included in the study.

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