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KNOWLEDGE, ATTITUDE AND PRACTICE OF LASSA FEVER PREVENTION AMONG HEALTH CARE PROVIDERS OF AHMADU BELLO UNIVERSITY TEACHING HOSPITAL (ABUTH) ZARIA.

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ABSTRACT

BACKGROUND:

The high virulence, significant mortality and morbidity and non-specific mode of presentation of Lassa fever (LF) has made it a disease of public health significance not just at the community level but also at an international level. Since the first reported outbreak, it is well documented that LF kills a disproportionate number of health workers involved in the management and care of patients in hospital settings. This study was carried out to assess the knowledge, attitude and practice of LF prevention among health care providers in ABUTH, Zaria.

METHOD:

Data were collected through the use of self-administered semi - structured questionnaires. The knowledge of respondents was assessed using a ten-question scoring system. Data was analyzed using SPSS version 26 and presented using tables. Chi-square test at p-value <0.05 level of significance was used to test for statistical significance of association between profession of respondents and knowledge of LF prevention.

RESULTS:

All the respondents (80) were aware of LF but only 66.3% of them had good knowledge of LF prevention. Majority of the respondents (97.5%) believed they used personal protective equipment (PPE) as a means of containing the spread of LF. However, only 7.5% of the respondents used goggle as PPE. Additionally, only 33.75% and 31.25% of the respondents wore face masks and boots respectively. Majority of the respondents with good knowledge (68.5%) and positive attitude (85.2%) towards LF prevention received training on LF prevention. There was significant ($p<0.05$) association between profession of the health care providers and knowledge of LF prevention.

CONCLUSION:

Training of health care providers on LF prevention strategies is key to good knowledge and practices towards LF prevention. This study recommends that training of health workers on LF should be paired with appropriate training on use of PPE.

KEYWORDS:

Knowledge, Attitude, Practice, Prevention, Lassa fever, Zaria

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INTRODUCTION

Lassa Fever is a disease of public health concern caused by the Lassa virus, which belongs to the Arenaviridae virus family [1]. The virus causes prolonged, asymptomatic infection with profuse viral excretion in Mastomys natalensis, a common and highly commensal rodent host. The virus is excreted in their urine and feces, which can infect food or household goods. Only 20 out of every 100 infected people develop symptoms, with an incubation period

ranging from 6 to 21 days.[1-3]. The disease is endemic in Ghana, Benin, Mali, Sierra Leone, Guinea, Liberia, and Nigeria, where the annual Lassa fever virus infection rate is estimated to be 100,000 to 300,000, with roughly 5,000 deaths. The virus has also been imported into The United States of America, Europe and Asia where it is not endemic [(4,5).]

Mastomys natalensis is the primary reservoir of the infection.

The relevance of LF as an epidemic-prone disease is demonstrated by an alert threshold of a single suspected case and an epidemic threshold of one confirmed case. The primary method of transmission is from rodent to human via contact with rodent excreta or urine in food, or during the killing and processing of rats for eating. The virus can transmit from person to person, either within households when caring for sick relatives or in health care settings that lack proper personal protective equipment (PPE). Percutaneous or per-mucosal contact to contaminated body fluids, particularly those containing blood, can lead to secondary human transmission. This is the most common mode of transmission in healthcare settings [1, 5.]

This nosocomial hazard can be reduced by implementing effective and prompt infection-control measures, carefully managing sick patients, and, in some situations, administering preventive medication to health care personnel following exposure. Lassa fever begins with symptoms and signs that are similar to those of other viral, bacterial, or parasitic diseases found in the tropics, such as malaria, typhoid, and other viral hemorrhagic fevers. After a 10-day incubation period, Lassa virus infection causes gradual fever and malaise with symptoms such as myalgia, stomach discomfort, nausea, vomiting, diarrhea, constipation, and sore throat. Bleeding symptoms are found in less than one-third of patients but indicate a poor prognosis. The mortality rate among hospitalized patients was estimated to be 15-20 percent in Nigeria [1,5]

Complications may include mucosal bleeding, eighth-nerve deafness, and pleural or pericardial effusion [1.]

Enzyme-linked immunosorbent assay (ELISA) for Lassa virus antigen, reverse transcriptase polymerase chain reaction, immunofluorescence test, and viral isolation are among the laboratory tests used to diagnose LF [1,2.]

Ribavirin is the current specific and successful treatment for LF. Ribavirin's methods of action are not fully understood, however it is known to have wide antiviral capabilities against both RNA and DNA viruses, as well as immunomodulatory effects. Non-specific supportive treatment may involve fluid replacement for dehydration and, if necessary, blood transfusions to correct anaemia.

LF is a notifiable disease that necessitates rigorous surveillance and prompt response to prevent or terminate epidemics. Unlike many other viral diseases for which preventive vaccinations are available, there is currently no licensed vaccine for human use, while many candidate vaccines have shown promise in animal studies [1, 5.]

Lassa fever is a disease with catastrophic and life-threatening consequences. About 300,000-500,000 new cases and 5000 deaths occur each year worldwide. Previous WHO reports estimated the case-fatality rate to be 1%-15% among hospitalized patients within 14 days of start in fatal cases [6.]

Between 2020 and 2023, 4,036 positive laboratory confirmed cases of LF were registered in Nigeria, with 762 people dying, for a national case fatality rate of 18.9% [7]. Despite the extremely contagious nature of LF among health care workers, the details of outbreaks and subsequent containment strategies have not been extensively documented in these locations, making it difficult to learn from these experiences and improve future outbreak management. There have been few published studies on the level of knowledge about LF in Kaduna state and among health-care providers. As a result, the purpose of this study was to investigate healthcare providers' knowledge, attitude, and practice of Lassa fever prevention at Ahmadu Bello University Teaching Hospital (ABUTH) in Zaria.

MATERIAIS AND METHODS

Population of the Study

It comprised of all health care providers of Ahmadu Bello University Teaching Hospital (ABUTH), Zaria where the sample for the study was drawn.

Study Area

ABUTH is located at Giwa local government area situated about 75km north of the capital city Kaduna, Nigeria. It is located on longitude 90°E and latitude 70°N and the average temperature is about 28°C-30°C with a dry humid climate and a peak annual rainfall of 100cm between June and September. It is a tertiary public health institution initially set up to cater for the health needs of the defunct Northern region at its inception. It is the largest hospital facility in the Northwestern geopolitical zone of Nigeria in terms of size and personnel.

ABUTH currently has a bed space of about 1,000 and is being managed by both clinical and non-clinical staff members, with a total patient admission turnover of more than 10,000 annually. The total number of health care providers is 2040 which comprises of doctors (819), nurses (727), medical laboratory staff (123), pharmacists (44) and health assistants (327). The hospital provides healthcare to residents of Zaria, neighbouring cities and states as well as serving as a tertiary referral centre for different disease.

Sample Size Calculations

Sample size was derived using the Kish formula: n= (z2pq/d2) for determining adequate sample size and further correcting for population less than 10,000 people 12 using the formula nf = n/1+ (n/N).

$$n= (z^2\ pq)/d^2$$

Where,

n = estimated minimum sample size (when population >10,000)

Z = standard normal deviate, given as 1.96 at 95% confidence interval.

p = the proportion of health workers that are aware of Lassa fever in a similar study done at Edo was 95% (4), q = 1 – p = 1 – 0.95 = 0.05, d = degree of precision = 0.05(5%)

Therefore,

$$n = \frac{1.962 \times 0.95 \times 0.05}{(0.05)2}$$

$$n = 0.182476/0.0025 = 72.99 = 73$$

Because the population is less than 10,000 the formula for estimating the sample size is;

$$nf = \frac{n}{1+n/N}$$

Where,

nf is the desired sample size when population is less than 10,000

n=the desire sample size when population is more than 10,000

N= the total population size= 2040

$$nf = \frac{73}{1+73/2040}$$

$$73/1.0358 =70$$

Non-response rate of 10% is expected and now added to the estimated sample size,

Hence, sample size= 70 + 0.1(70). The corrected sample size is 77.

However, three is added to the minimum sample size to make it up to 80.

Validity of Instruments

The Instrument for data collection was a self-structured questionnaire which was drafted under supervision and validated by three public health experts from department of Community Medicine, ABU Zaria.

Data collection tool

A self-administered structured questionnaire containing closed ended questions was used and the questionnaire captured information on socio-demographic variables, knowledge, attitude and practices of Lassa fever prevention among clinical staff in ABUTH Zaria.

Data analysis

Data analysis was done using the Statistical package for social sciences (SPSS) software version 21.0. The results were presented in charts, graphs and tables. Chi square was used to test for significant association between variables at a confidence level

of 95%. Probability value of p≤0.05 was used to interpret significance. Knowledge of Lassa fever prevention was assessed using a 10-question scoring system on basic information about the epidemiology and prevention of the disease. Each correct answer carries a score of 2. A score of less than 8 was assessed as negative attitude while a score of ≥ 8 was assessed as positive attitude.

Seven (7) questions were used to assess practice. Each correct response to the first 5 questions was scored as 1 while the remaining 2 questions were each scored as 2.5 for correct response. Total score of 6-10 was assessed as good practice while score of <6 is assessed as poor practice.

Ethical Considerations

Ethical approval for the study was obtained from Ethical Committee of ABUTH Zaria with approval number CM/24/1009. The participants were briefed on the objectives of the study, and their written consent was also obtained before commencing the study.

RESULTS

A total of 80 healthcare workers responded to the questionnaire giving a response rate of 100%. Mean age of respondents was 35.6 ± 8 years. Majority of the respondents were males (56.2%), Christians (53.8%) and of Hausa ethnic group (37.5%) as shown in Table 1.

Table 1: Socio-demographic characteristics of health care providers in ABUTH Zaria

VARIABLE	FREQUENCY	PERCENTAGE (%)
Age (years)		
18-22	2	2.5
23-27	9	11.3
28-32	22	27.5
33-37	16	20.0
38-42	13	16.3
43-47	13	16.3
48-52	4	5.0
53-57	1	1.3
Sex		
Male	45	56.2
Female	35	43.8
Religion		
Islam	37	46.3
Christianity	43	53.7
Tribe		
Hausa	30	37.5
Yoruba	26	32.5
Igbo	17	21.2
Others	7	8.8
Profession		
Doctor	38	47.5
Nurse/Midwife	33	41.25
Pharmacist	3	3.75
Laboratory Scientist/Technologist	6	7.5
Training on Lassa fever prevention		
Yes	54	67.5
No	26	32.5

n = 80 Mean age = 35.6 ± 8 years

All the (80) respondents have heard of the illness of Lassa fever (Table 2).

Table 2: Distribution of respondents by knowledge of Lassa fever prevention.

VARIABLE	FREQUENCY	PERCENTAGE (%)
Heard of the illness called Lassa fever	2	2.5
Yes	80	100
No	0	0
Do you know the agent that causes Lassa fever		
Yes	80	100
No	0	0
What vector transmits Lassa fever		
Mosquito	0	0
Dog	0	0
Multi-mammate rat	80	100
Housefly	0	0
What ways can Lassa fever be transmitted (Can tick more than one)		
Mosquito bite	0	0
Contact with infected blood and body fluid	59	0
Ingestion of rat	44	73.75
Eating food contaminated by urine and faeces of the rat	73	55
Others	0	0

VARIABLE	FREQUENCY	PERCENTAGE (%)
Groups of people at risk of contracting the infection (Can tick more than one)		
Farmers	17	21.25
Health workers	31	38.75
Only men	2	2.5
Only women	2	2.5
Everybody	52	65
Symptoms of Lassa fever infection (Can tick more than one)		
Headache	71	88.75
Fever	78	97.5
Diarrhoea	43	53.75
Bleeding gum	67	83.75
Others	1	1.25
Complications that can result from Lassa fever infection (Can tick more than one)		
Pleural effusion	38	47.5
Pericarditis	38	47.5
Seizures	45	56.25
Deafness	41	51.25
Others	0	0
Drug treatment of Lassa fever		
Acyclovir	3	3.75
Lamivudine	6	7.5
Valacyclovir	3	3.75
Ribavirin	68	85
Others	0	0
How can Lassa fever infection be prevented (Can tick more than one)		
Avoid contact with rats	66	82.5
Environmental sanitation	56	70
Isolation of infected individuals	73	91.25
Use of PPE by health workers in the treatment of infected individuals	71	88.75
Others	0	0
Is there any available vaccine that is effective against Lassa virus in humans		
Yes	6	7.5
No	52	65
Not sure	22	27.5

Majority of the respondents (82.5%) said they cannot eat together with a person infected with Lassa fever (Table 3).

Table 3: Distribution of respondents based on attitude towards Lassa fever prevention.

VARIABLE	FREQUENCY	PERCENTAGE (%)
Can you sleep in the same room with a person infected with Lassa fever		
Yes	7	8.75
No	66	82.5
Never	7	8.75
Will you buy anything from someone if you knew they have Lassa fever infection		
Yes	15	18.75
No	59	73.75
Never	6	7.5
Can you eat with a person infected with Lassa fever		
Yes	6	7.5
No	66	82.5
Never	8	10
Would you show some discriminatory attitude towards people suspected of having Lassa fever		
Yes	41	51.25
No	37	46.25
Never	2	2.5
A person who has been diagnosed with Lassa fever must be admitted in Lassa fever treatment center		
Yes	77	96.25
No	1	1.25
Not sure	2	2.5
People who have direct contact with a person who has been diagnosed with Lassa fever must be quarantined for some weeks		
Yes	76	95
No	3	3.75
Not sure	1	1.25
Yes		
No		
Not sure	22	27.5

Table 4: Distribution of respondents by their practice of Lassa fever prevention.

VARIABLE	FREQUENCY	PERCENTAGE (%)
Do you practice hand washing		
Yes	80	100
No	0	0
How Often		
Always	52	65
Most of the time	25	31.25
Sometimes	3	3.75
Rarely	0	0
Never	0	0
When do you wash your hands? (Can tick more than one)		
Before and after touching a patient	59	73.75
After touching body fluid	68	85
After touching patient surrounding or any other potentially contaminated area	71	88.75
Before and after any procedure on a patient	61	76.25
Between tasks on same patient	27	33.75
After exit from the ward area	66	82.5
After handling any material from the patient	39	48.75
Do you use PPE		
Yes	78	97.5
No	2	2.5
How Often		
Once a week	1	1.25
Twice a week	2	2.5
Everyday	75	93.75
Once a month	1	1.25
Others	1	1.25
Which of the PPE do you use (Can tick more than one)		
Gowns/aprons	35	43.75
Gloves	66	82.5
Face mask	27	33.75
Boots	25	31.25
Goggle	6	7.5
All of the above	16	20
None of the above	0	0
Action you will take in case of exposure to suspected case of Lassa fever		
Self-medication	4	5
Report to health authority for medical check-up	76	95
Report to church/mosque	0	0
None of the above	0	0

Majority (66.3%) of the clinical staff had good knowledge of Lassa fever prevention (Table 5).

Table 5: Knowledge of Lassa fever prevention among clinical staff of ABUTH Zaria

LEVEL OF KNOWLEDGE	FREQUENCY	PERCENTAGE (%)
Good	53	66.3
Fair	26	32.4
Poor	1	1.3
Total	80	100

Majority (80%) of the clinical staff had positive attitude while 20% had negative attitude towards Lassa fever prevention (Table 6).

Table 6: Attitude towards Lassa fever prevention among clinical staff of ABUTH Zaria

TYPE OF ATTITUDE	FREQUENCY	PERCENTAGE (%)
Positive attitude	64	80
Negative attitude	16	20
Total	80	100

Seven two (90%) of the clinical staff had good practice while 10% had poor practice prevention (Table 7).

Table 7: Practice of Lassa fever prevention among clinical staff of ABUTH Zaria

TYPE OF PRACTICE	FREQUENCY	PERCENTAGE (%)
Good practice	72	90
Poor practice	8	10
Total	80	100

There was significant ($p<0.05$) statistical relationship between knowledge of the clinical staff on Lassa fever prevention and their profession (Table 8).

Table 8: Relationship between knowledge of Lassa fever prevention and profession of health care provider in ABUTH Zaria

Profession	Level of knowledge of the clinical staff			Total
	Poor	Fair	Good	
Doctors	-	9 (23.7%)	29 (76.3%)	38 (100%)
Nurses	-	12 (36.4%)	21 (63.6%)	33 (100%)
Pharmacist	-	1 (33.3%)	2 (66.7%)	3 (100%)
Lab. scientist/ tech.	1 (16.7%)	4 (66.7%)	1 (16.7)	6 (100%)
Total	1 (1.3%)	26 (32.5%)	53 (66.3%)	80 (100%)
$\chi2 = 18.391$	df = 6	P = 0.005		

There was no significant statistical relationship between gender of the clinical staff and their knowledge of Lassa fever prevention (Table 9).

Table 9: Relationship between respondents' gender and the knowledge of Lassa fever prevention among clinical staff of ABUTH Zaria

Sex of clinical staff	Level of knowledge of the clinical staff			Total
	Poor	Fair	Good	
Male	-	13 (28.9%)	32 (71.1%)	45 (100%)
Female	1 (2.9%)	13 (37.1%)	21 (60%)	35 (100%)
Total	1 (1.3%)	26 (32.5%)	53 (66.3%)	80 (100%)
$\chi2 = 2.065$	df = 2	P = 0.356		

There was no significant statistical relationship between training on Lassa fever prevention and the knowledge of Lassa fever prevention among the clinical staff (Table 10).

Table 10: Relationship between training on Lassa fever prevention and knowledge of Lassa fever prevention among clinical staff of ABUTH Zaria

Training on Lassa fever prevention	Level of knowledge of the clinical staff			Total
	Poor	Fair	Good	
Clinical staff with training	-	17 (31.5%)	37 (68.5%)	54 (100%)
Clinical staff without training	1 (3.8%)	9 (34.6%)	16 (61.5%)	26 (100%)
Total	1 (1.3%)	26 (32.5%)	53 (66.3%)	80 (100%)
$\chi2 = 2.259$	df = 2	P = 0.323		

There was no significant ($p>0.05$) statistical relationship between designation of clinical staff and their attitude towards Lassa fever prevention (Table 11).

Table 11: Relationship between profession and attitude towards prevention of Lassa fever among health care providers in ABUTH

Profession	Attitudes of the clinical staff		Total
	Negative attitude	Positive attitude	
Doctors	5 (13.2%)	33 (86.8%)	38 (100%)
Nurses/ midwives	8 (24.2%)	25 (75.8%)	33 (100%)
Pharmacist	-	3 (100%)	3 (100%)
Lab scientist/ technologist	3 (50%)	3 (50%)	6 (100%)
Total	16 (20%)	64 (80%)	80 (100%)
$\chi2 = 5.608$	df = 3	P = 0.132	

There was no significant statistical relationship between training on Lassa fever prevention and the attitude of clinical staff towards Lassa fever prevention (Table 12).

Table 12: Training on Lassa fever prevention and attitude of clinical staff towards Lassa fever prevention in ABUTH Shika

Training on Lassa fever prevention	Attitudes of the clinical staff		Total
	Negative attitude	Positive attitude	
Clinical staff with training	8 (14.8%)	46 (85.2%)	54 (100%)
Clinical staff without training	8 (30.8%)	18 (69.2%)	26 (100%)
Total	16 (20%)	64 (80%)	80 (100%)
$\chi2 = 2.792$	df = 1	P = 0.095	

There was no significant statistical relationship between designation of the clinical staff and their practice of Lassa fever prevention (Table 13).

Table 13: Relationship between profession and the practice of Lassa fever prevention among clinical staff of ABUTH Zaria

Profession	Practice of Lassa fever prevention		Total
	Poor practice	Good practice	
Doctors	4 (10.5%)	34 (89.5%)	38 (100%)
Nurses/ midwives	3 (9.1%)	30 (90.9%)	33 (100%)
Pharmacist	-	3 (100%)	3 (100%)
Lab scientist/ technologist	1 (16.7%)	5 (83.3%)	6 (100%)
Total	8 (10%)	72 (90%)	80 (100
$\chi 2 = 0.672$	df = 3	P = 0.880	

There was no significant statistical relationship between training on Lassa fever prevention and the practice of Lassa fever prevention among the clinical staff (Table 14).

Table 14: Relationship between Training on Lassa fever prevention and the practice of Lassa fever prevention among clinical staff of ABUTH Zaria.

Profession	Practice of Lassa fever prevention		Total
	Poor practice	Good practice	
Clinical staff with training	5 (9.3%)	49 (90.7%)	54 (100%)
Clinical staff without training	3 (11.5%)	23 (88.5%)	26 (100%)
Total	8 (10%)	72 (90%)	80 (100%)
$\chi 2 = 0.101$	df = 1	P = 0.750	

Discussion

Lassa fever is a notifiable disease that is highly contagious. Proper awareness on Lassa fever should lead to a positive attitude and practices targeted at preventing the disease spread. Expectedly, majority of the respondents in our study had good knowledge of Lassa fever prophylaxis because the study was conducted in a tertiary health care setting. . This finding corroborated with the result of previous research conducted at other tertiary healthcare facilities in Nigeria [4,9]. The observed superior awareness of LF prevention among doctors validated the finding of a study conducted in Esan West Local Government Area of Edo State, which likewise indicated that medical doctors had the better understanding of LF prevention [4].

However, findings from research conducted at the community level, primary and secondary healthcare facilities revealed that the majority of respondents had limited understanding of LF [14, 15]. The variations in these results could be attributed to respondents' varying access to LF information and the study area's location. This current study found a statistically significant ($p<0.05$) association between level of knowledge about LF prevention and profession of the healthcare providers. This finding is not consistent with the result of a previous study conducted among primary health care workers that showed no significant relationship ($p>0.05$) between level of knowledge about LF prevention and profession of the healthcare providers [12]. There was no significant association between respondents' knowledge of LF and respondent's gender, or receiving previous training on LF prevention.

This finding corroborated with the result of a previous study conducted among a multi-disciplinary mix of healthcare workers in a referral treatment centre in Nigeria [13].

Finding from this study also showed that 100% of the respondents were aware of LF and the etiological agent. This is contrary to the finding of a previous study in which only 87% of the respondents were aware of the disease and 71.5% mentioned rats as the animal species that transmit LF virus to human [14]. Most of the respondents from this study were aware that Lassa fever can be transmitted by contact with infected blood, body fluids, ingestion of rat and eating food contaminated by urine or feces of rat. This finding is not consistent with the result of a previous study, which found that only 47% and 27% of respondents believed that LF was transmitted through contact with rats' urine and fluids from sick people, respectively [10].

The fact that most respondents were aware of ribavirin as a medication treatment for LF is not surprising given that most respondents are well-versed in LF. This is consistent with the findings of Adebayo and Amaechi in 2015 [16].

Although the findings of this study revealed no significant statistical relationship between attitudes toward LF and the profession of healthcare

workers, another study found that healthcare workers with more years of experience have better infection prevention and control practice than those with less training [17]. This may not be unconnected with variation in the duration of their training.

The fact that all of the respondents in this survey practice hand washing is not surprising given their knowledge of LF prevention. However, this contradicts the findings of a descriptive cross-sectional study conducted at the University of Uyo Teaching Hospital among doctors and medical students which revealed a negative attitude of the respondents despite their extensive understanding of Lassa fever [18].

This could be attributable to a decreased incidence of LF at the University of Uyo Teaching Hospital compared to other tertiary care facilities.

Limitations of the study:

The limited sample size used in the study can affect generalization of the findings of the study to all health care providers. The study also relies on self-reported data and as such it should be interpreted with caution as respondents' bias (especially regarding practice) could interfere with the findings of the study. Additionally, the study cannot assess whether an intervention such as training program has a lasting impact since it is a one-off survey.

Conclusion

Healthcare providers of ABUTH have good knowledge of Lassa fever prevention but poor practice towards preventing Lassa virus infection. Training of health care providers on LF prevention strategies is key to good knowledge and practices towards LF prevention. To prevent transmission of Lassa fever, community awareness, adequate provision of personal protective equipment and good infection prevention practices should be prioritized. There is also need for improved community sanitation, rodent eradication as well as early detection, prompt isolation and provision of free care to all cases of Lassa fever so as to cutdown further spread of the infection to health care workers and the general population.

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Data availability

Data for this study are available from the corresponding author on request.

Conflicts of interest statement

We declare no conflict of interest.

Authors' contributions

AA: Conceptualization.
NM: Drafting of manuscript.
IN: Methodology.
KU and SI: Proof Reading.
AB, SF and JE: Data collection.

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