VOL 2, NO. 11: NOVEMBER, 2025
AN OPEN ACCESS PEER-REVIEWED JOURNAL
Frontline Professionals Journal 2(11), 232-241, EISSN 1596-0501

Original Research Article

IRREVERSIBLE OCULAR SEQUELAE FOLLOWING LASSA FEVER: CLINICAL EVIDENCE FROM A SURVIVOR MANAGED AT FMC OWO ISOLATION CENTRE, ONDO STATE, NIGERIA.

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Author's contributions
This study was a collaborative effort of the authors. The authors reviewed and approved the final version of the manuscript for publication.

Article Information
DOI: https://doi.org/10.60787/fpj.vol2no11.232 -241
EISSN 1596-0501E
Website: https://frontlineprofessionalsjournal.info
Email: frontlineprofessionalsjournal@gmail.com

CITATION: Isaac Ihinmikaye, Olufemi Oladele Ayodeji, Adetumi Adetunji Subulade, Olalekan Ojo, Temitope Emmanuel Taiwo, Liasu Adeagbo Ahmed. (2025). Irreversible ocular sequelae following Lassa fever: clinical evidence from a survivor managed at Fmc Owo isolation Centre, Ondo State, Nigeria. *Frontline Professionals Journal* 2(11), 232 -241

ABSTRACT
Lassa fever continues to pose a major public health challenge in West Africa. Beyond its well-recognized systemic complications, emerging evidence shows that survivors may develop long-term sequelae affecting vital organs, including the eyes. However, severe visual impairment remains rarely documented and frequently under-recognized. We present the case of a young female survivor of PCR-confirmed Lassa fever who received care at the Infection Control and Research Centre, Federal Medical Centre, Owo, Nigeria. Her acute illness was complicated by coagulopathy and hemorrhagic features, prompting close clinical monitoring during and after treatment.
Although systemic symptoms gradually resolved with ribavirin therapy and supportive care, she developed progressive visual decline in the left eye during convalescence. Ophthalmic evaluations over time revealed vitreous hemorrhage, complicated cataract, and subsequent retinal detachment—leading to irreversible monocular blindness despite late surgical intervention. These findings highlight significant vascular and inflammatory injury likely driven by Lassa virus-induced endothelial damage and coagulation abnormalities.
This case is the first documented irreversible blindness in a Lassa fever survivor, which underscores that Lassa fever is not only an acute viral threat but also a cause of lasting visual disability. Early ophthalmic assessment during hospitalization and structured follow-up for survivors could enable timely detection and intervention for eye complications. Strengthening post-discharge care and further research into viral ocular tropism and targeted therapies are urgently needed to prevent avoidable blindness in Lassa fever survivors.

Keywords: Lassa fever, Ocular complications, Vitreous haemorrhage, viral haemorrhagic fever, Ophthalmology, Case report.

1.0 INTRODUCTION

Lassa fever (LF) remains a major viral haemorrhagic fever threat in West Africa, where it causes recurrent outbreaks with significant morbidity and mortality. The disease is caused by Lassa virus (LASV), an Arenaviridae family pathogen maintained primarily in Mastomys rodent species, whose excreta contaminate food and household environments, enabling zoonotic spillover to humans.(Asogun *et al.,* 2019) Human-to-human transmission also occurs, particularly in healthcare settings where exposure to infected blood or body fluids is common and infection prevention practices may be suboptimal (Asogun *et al.,* 2019).

Following an incubation period ranging from 7 to 21 days, clinical presentation varies markedly—from mild, nonspecific febrile illness to severe, life-threatening multi-organ dysfunction characterized by vascular leakage, plasma volume depletion, coagulopathy, and haemorrhage.(Happi *et al.,* 2024) Symptoms of disease can vary widely from mild flu-like illness to severe multi-organ dysfunction caused by fever, vascular permeability, decreased plasma volume, coagulation abnormalities, and varying degrees of hemorrhage.(Happi *et al.,* 2024) Survivorship is increasingly common due to expanding access to ribavirin therapy and improved supportive care; however, long-term complications in convalescence are gaining recognition as an emerging public health challenge. One under-recognized but potentially disabling consequence of LASV infection is ocular involvement. While conjunctivitis and other anterior segment changes have been noted during the acute phase, the true spectrum and burden of vision-threatening disease in survivors remains poorly understood.(Karnam *et al.,* 2023; Li *et al.,* 2020) This gap in knowledge is concerning, especially in endemic communities where access to ophthalmologic care is limited and irreversible damage may go undetected. This case report therefore highlights a rare but severe ocular sequela observed in a young survivor of confirmed Lassa fever managed at the Infection Control and Research Centre, Federal Medical Centre Owo, Ondo State, Nigeria. By documenting her clinical course, we aim to raise awareness among clinicians and policymakers of the need for early detection, timely intervention, and structured long-term ophthalmic follow-up for individuals recovering from Lassa fever.

2.0 MATERIALS AND METHODS

This case report was conducted at the Infection Control and Research Centre (ICRC) of the Federal Medical Centre, Owo (FMC), Ondo State, Nigeria. The patient was a 24-year-old female who presented with symptoms suggestive of viral haemorrhagic fever and was subsequently managed for PCR-confirmed Lassa fever.

Study Design

This single-patient clinical case report was designed to document the diagnosis, management, and ophthalmic sequelae observed during acute illness and follow-up period. Information was obtained from clinical assessments during hospitalization and from outpatient clinic records.

Case Management and Clinical Assessment

Upon admission, the patient underwent comprehensive clinical examination, including vital signs monitoring and systemic evaluation of cardiovascular, respiratory, abdominal, neurological, and ocular systems. Supportive therapy, ribavirin administration, antimicrobials, fluid resuscitation, blood transfusions, and symptomatic treatment followed national and institutional Lassa fever management guidelines.

Laboratory and Diagnostic Investigations

Serial laboratory tests—including complete blood count, liver and renal function tests, electrolytes, and urinalysis—were performed during hospitalization to assess disease severity, treatment response, and complications. Lassa virus infection was confirmed by reverse transcriptase–polymerase chain reaction (RT-PCR), with cycle threshold (CT) values recorded for both G and L genes. Malaria rapid diagnostic testing was performed to exclude co-infection.

Ophthalmologic Evaluation

Eye examinations were conducted on the 5th and 7th days of hospital admission following complaints of reduced vision and repeated afterward during convalescence at 1month and 17 months.

Data Collection

Demographic data, clinical history, laboratory results, imaging records, and treatment course were extracted from the patient's medical file.

Ethical Considerations

Patient confidentiality was ensured by anonymizing personal identifiers. Informed consent was obtained from the patient for the use of clinical information and images for research and publication purposes. Ethical approval was obtained from the Health Research and Ethics Committee (HREC) of the Federal Medical Centre Owo with the approval number: FMC OWO/HREC/2025/53.

3.0 CASE PRESENTATION/RESULTS

HISTORY

A 24-year-old female undergraduate student of University of Benin, Benin city, Edo state of Nigeria who resides in Benin City. She is Yoruba, Christian, and single. Her last menstrual period was said to be about few weeks prior to presentation. She was transferred to the isolation centre from the accident and emergency unit, as a suspected Lassa fever case with complaints of fever, abdominal pain, abnormal vaginal bleeding all of 1 week duration and bleeding from injection sites of 12 hours duration prior to presentation.

She was in her usual state of health until a week prior to presentation when she developed fever described as of insidious onset high grade, continuous, transiently relieved by antipyretics and persisted till presentation at our isolation centre. There were associated headache, malaise and anorexia. Abdominal pain located at the lower quadrants and epigastric region was insidious in onset, described as dull and burning respectively, intermittent, non-radiating, with no known aggravating or relieving factor(s) and of moderate severity. There was associated history of nausea and occasional vomiting of recently ingested food. No history of abdominal swelling, jaundice, changes in bowel habit, hematemesis or hematochezia.

Abnormal vaginal bleeding began concurrently with fever and abdominal pain. Bleeding was said to be active with no clots, necessitating the use of 3-4 sanitary pads daily. No history of irregular menstruation, menorrhagia or contraceptive use. Bleeding from puncture sites was noticed about 12 hours prior to presentation, following a prolonged bleeding time. There was history of recent travel to Owo, a Lassa fever endemic town, about 2 weeks prior to onset of symptoms, patronage of food vendors, indwelling rodents and no use rodent-proof containers for food storage. No history of recent funeral attendance, consumption of rats or contact with person(s) with similar symptoms. No history of bleeding from craniofacial orifices, oliguria, hematuria, dysuria, irrational behaviour or loss of consciousness. Following onset of symptoms, she presented to a primary health centre in Benin where she was managed for malaria on outpatient basis with intramuscular and oral medications. She however presented to a private hospital in Owo due to proximity to her family and persistence of symptoms where she spent 5 hours on admission. She was subsequently referred to the accident and emergency unit due to worsening of symptoms. At the accident and emergency room, she was noticed to be anxious, febrile (39.7°C), pale, dehydrated,

and hypotensive (80/40 mmHg) and urgent PCV was 18%. She was subsequently managed as a case of acute viral illness (likely Viral Hemorrhagic Fever) with fluid resuscitation, parenteral antibiotics, antimalarial, proton pump inhibitor, antipyretics, and a stat dose of IV ribavirin. One unit of whole blood was transfused. No chronic medical conditions, no previous blood transfusions and no past surgeries. No known drug allergy. No alcohol consumption, not a cigarette smoker, no illicit drug use. Review of systems was not contributory.

Examination

On Admission she was acutely ill-looking, febrile (37.8°C), mildly pale, anicteric, acyanotic, not dehydrated, SpO_2 96%. Cardiovascular examination revealed PR of 101 bpm, BP of 98/53 mmHg. Respiratory examination showed RR of 22 cpm and the chest was clinically clear on auscultation. On abdominal examination, the abdomen was flat, moved with respiration with mild suprapubic and epigastric tenderness, no organomegaly, normal bowel sounds. On neurological examination, she was conscious, oriented, normal tone, power, and reflexes. Genitourinary examination revealed normal female external genitalia, there was a blood-stained perineal pad. A provisional diagnosis of suspected Lassa fever complicated by anaemia and disseminated intravascular coagulopathy (DIC) was made.

Investigations

The baseline investigations at admission showed Lassa PCR: Positive (CT 28.56 / 26.87); FBC: Mild anaemia (PCV 28.9%), leucocytosis (15,300/uL), thrombocytopenia (83,000/uL), Electrolytes (mmol/L): Na 129, K 3.5, HCO_3 21, Cl 98, Ca 2.0; Renal: Cr 183 µmol/L, Urea 11.8 mmol/L; Liver: ALP 553 IU/L, ALT 496 IU/L, Albumin 26 g/L, TP 55 g/L. Subsequent investigations showed fluctuating PCV, worsening thrombocytopenia, recurring hypokalaemia, persistent hematuria, and gradually improving liver enzymes. Repeat Lassa PCR on Day 10 showed decreasing viral load but remained positive (CT 37.20/33.06). The laboratory results timeline (day – intervention – outcome) is showed in the table below:

TABLE 1: Laboratory results timeline (day – intervention – outcome)

Day	Key Lab. Findings	Intervention	Outcome
0 Accident and Emergency room (A/E)	PCV 18%, RBG 6.9	2 pints of whole blood; Ribavirin stat	Stabilized for transfer
2/BL	PCR positive (CT 37.20/33.06); PCV 28.9%; WBC 15,300; PLT 83,000; ALT 496; ALP 553; Cr 183, Ur- 11.8	Continued ribavirin; antibiotics, tranexamic acid, had 3rd pint of blood transfusion	Diagnosis confirmed, anaemia addressed
3	PCV 30.7%; PLT 53,000	4th pint of whole blood (on the 6th day)	-
7	PCV 31%; PLT 41,000; K 2.1; ALT 107; AST 262	Potassium replacement	Hypokalemia improved
9	PCV 25.1%; PLT 21,000; K 2.8	5th and 6th pints of Blood transfusion	Anaemia addressed
11	PCV 33%; PLT 30,000	7th pint of Blood transfusion	PLT count improved
14	PCV 36%; PLT 36,000	Counseled for platelet concentrate (not affordable), 8th pint of blood	PLT count improved

18	PCV 40%; PLT 119,000; BUN- 2.5, Cr-44; ALP- 191, ALT- 50, AST- 70, Alb-34, TP-70	-	Clinically stable

Treatment

The following treatments were instituted in the course of her management: intravenous Ribavirin- Irrua regimen (100mg/kg stat, then 25mg/kg daily × 6 days, then 12.5mg/kg daily × 3 days and 12.5 mg/kg/day × 5 days extension; IV Ceftriaxone 1 g 12 hourly; IV Metronidazole 500 mg 8 hourly; IV Paracetamol 1 g 8 hourly; IV Tranexamic Acid 500 mg 8 hourly; IV Vitamin K 5 mg daily × 3 days; IV fluids; Multiple whole blood transfusions (8 pints total); IV Omeprazole for gastritis; Antibiotics for cough (oral & IV Augmentin, Azithromycin); Potassium replacement; Antimalarial (Artemether–Lumefantrine). The treatment timeline (day – intervention – outcome) is showed in the table below:

TABLE 2: Treatment timeline (day – intervention – outcome)

Day	Clinical Findings	Intervention	Outcome
0(Accident and Emergency room)	Fever 39.7°C, hypotension (80/40), dehydration, PCV 18%, active bleeding, epigastric tenderness	Fluid resuscitation, IV antibiotics, antimalarial, PPI, antipyretics, IV Ribavirin 6 g stat, 1-pint whole blood transfused	Stabilized for transfer; symptoms persisted
1	Febrile 37.8°C, mildly pale, tachycardic, vaginal bleeding, bleeding from puncture sites	IV NS/5% DW, Ribavirin 1.5 g daily, Ceftriaxone, Metronidazole, PCM, Vitamin K, Tranexamic acid; urethral catheterization; 2nd pint whole blood	Hemodynamics improved; bleeding ongoing
2	Persistent fever; prolonged bleeding; Lassa PCR positive; PCV 28.9%, PLT 83,000, ALT 496	Continued all medications; 3rd pint whole blood	Diagnosis confirmed, clinical instability, bleeding persisted
3	Still febrile, bleeding from puncture sites, epigastric pain; PCV 30.7%, PLT 53,000	Commenced IV Omeprazole, 4th pint of whole blood transfusion	Gastritis treated; bleeding persisted
5	Left eye visual difficulty, cough, bilateral conjunctival injection	Oral Augmentin started; Ophthalmology review initiated	Not yet stable, still bleeding, ocular complaints noted
6	Persistent fever + cough	Oral Converted to IV Augmentin, 4th pint	Cough persisted; mild clinical improvement

7	Febrile; PCV 31%, PLT 41,000; K 2.1; worsening thrombocytopenia	Reviewed by ophthalmologist; B-scan USS requested; IV potassium correction	Improved potassium; ocular diagnosis pending
8	Bleeding from puncture sites resolved; hematuria ongoing, still febrile	Continued supportive therapy	Partial improvement; urine still coke-colored
9	Distressing cough, hematuria, fever, mild jaundice; PCV 25.1%, PLT 21,000; K 2.8	Started Augmentin + Azithromycin + Expectorant (Broncholyte); 5th pint whole blood	Respiratory symptoms improved slightly
10	Persistent fever, PCR still positive (CT 37.20/33.06)	Ribavirin extension (12.5 mg/kg × 5 days), treated malaria (AL 80/480 mg ×3/7), 6th pint of whole blood	Viral load decreasing (higher CT values)
11	Fever improving; post-transfusion PCV 33%	Continued therapy	Fairly stable
12	Ongoing melena + hematuria; PCV 33%	7th pint of whole blood	PCV supported; bleeding gradually improving
13	Fever subsiding; melena and hematuria reducing	Supportive therapy	Clinical recovery beginning
14	Fever resolved, PCV 36%, PLT 36,000	Counseled for platelet transfusion (not affordable to patient)	Continued to improve
15	Persistent thrombocytopenia	8th pint of whole blood given instead of platelets	Symptoms stabilizing
18	Melena & hematuria resolved; urinalysis: Blood ++, Protein ++; PCV 40%, PLT 119,000	Supportive therapy	Laboratory & clinical improvement; stable
19	Stable vitals	None	Discharged home to be seen as outpatient

	in one week for repeat PCR

Follow-Up

At her first clinic appointment, she complained of abdominal pain and passage of watery stool and was treated for enteritis with oral ciprofloxacin and metronidazole. She also had a repeat PCR test done which was negative. She was then given a three-week appointment due to her examination schedule at school, but since then defaulted due largely to her school location and intense school activities at the time. She presented to the ophthalmology unit at the University College Hospital (UCH) where she spent her holiday, about a month later, on account of sudden reduction in vision in the left eye. Fundoscopic examination at presentation revealed active inflammatory process with intense activity in the anterior chamber and poor view of the fundus.

An assessment of left panuvitis with vitreous hemorrhage was made. B-scan ultrasonography revealed left vitreous hemorrhage, no retinal detachment. She was however referred to the vitroretinal surgeon, Eye Foundation Hospital, Ikeja, Lagos for a second opinion. At Eye Foundation Hospital, a diagnosis of complicated cataract with vitreous hemorrhage was made. She was counseled for surgery of the left eye but declined on financial ground. She was also seen at the ophthalmology clinic in this centre about a year and five months post discharge with complaint of no vision on the left eye and verbal report of B-scan ultrasonography which showed retinal detachment of the left. Fundoscopic examination revealed lens opacity of the left eye and pale capped disc of the right eye with cup-disc ratio of 0.7.

An assessment of left cataract with suspected retinal detachment and right eye suspicious disc was made. B-scan ultrasonography was requested, she was counseled on guarded prognosis for left eye cataract extraction and was given two-week appointment but also defaulted since then. She eventually presented to the ophthalmology department at the University of Benin Teaching Hospital (UBTH). Eye examination at presentation revealed visual acuity of 6/5 and LP (light perception) on the right and left eye respectively, intraocular pressure was 18 and 15 (mmHg) on the right and left eye respectively. B-scan ultrasonography showed retinal detachment with aqueous and vitreous hemorrhage. A diagnosis of complicated cataract with suspected retinal detachment of the left eye and glaucoma of the right eye was made. She eventually had Large Incision Cataract Surgery. Vision remained poor, requiring referral for vitreoretinal surgery.

4.0 DISCUSSION

Ocular involvement during the acute phase of Lassa fever has been documented, although descriptions remain limited. Reported presentations include conjunctivitis, conjunctival oedema, and subconjunctival haemorrhage, suggesting that LASV can affect the anterior segment early in the disease course.(Gary *et al.,* 2019)(Alikah *et al.,* 2020) Despite these observations, the full spectrum of vision-related complications among survivors, as well as their long-term clinical implications, is still not well understood.(Karnam *et al.,* 2023) Insights from other viral haemorrhagic fevers indicate that eye manifestations can range from mild and self-resolving conditions—such as conjunctival injection and ocular surface irritation—to more severe inflammatory damage capable of permanent visual impairment.(Kuthya *et al.,* 2021).

Indeed, temporary vision loss during convalescence has been reported, further emphasizing that visual symptoms may extend beyond the acute phase of infection.(Karnam *et al.,* 2023) Evidence from survivor studies reinforces these concerns. In a Sierra Leone cohort, visual acuity was poorer among individuals exhibiting signs of both anterior and posterior segment disease, including cataracts, glaucoma, and chorioretinal scarring—features that point to prior uveitic episodes.(Li *et al.,* 2020) Experimental data from animal models provide additional biological plausibility: extensive ocular inflammation has been demonstrated in fatal LASV infection among guinea pigs, involving structures such as the anterior uvea, ciliary body, corneal endothelium, and conjunctiva, whereas survivors displayed minimal ocular pathology.(Gary *et al.,* 2019) Clinical findings from an ophthalmic study in Irrua, Nigeria also support the presence of ocular abnormalities among patients with Lassa fever.(Alikah *et al.,* 2020)

Although more than 80% maintained normal presenting visual acuity, nearly one-quarter experienced adnexal changes—including ptosis, tearing, and lid oedema—and more than half displayed diffuse conjunctival injection. Less frequent but notable corneal complications, such as keratic precipitates and dendritic ulcers, were also observed.(Alikah *et al.,* 2020). In contrast to these predominantly reversible findings, the present case demonstrates a far more devastating outcome—irreversible vision loss in one eye. Such an outcome remains rare in the existing literature, where visual impairment is typically transient. This case therefore strengthens the recognition that LASV-induced endothelial injury and coagulation abnormalities may contribute to severe ophthalmic complications, including subconjunctival and vitreous haemorrhage, and eventual structural damage within the eye.

5.0 CONCLUSION

LASSA FEVER IS not only a systemic and life-threatening viral illness, but also a disease with end-organ (ocular) affectation that is capable of causing significant and lasting visual disability. While ocular involvement has been reported during acute infection, irreversible blindness such as seen in this patient remains rare and may easily go unrecognized without proactive surveillance. The constellation of vitreous haemorrhage, retinal detachment, and complicated cataract observed in this case highlights the destructive potential of LASV-mediated vascular and inflammatory injury. Delayed access to ophthalmologic intervention—driven by financial and structural barriers—likely contributed to poor visual outcomes in this case, underscoring gaps in survivor care in resource-limited settings. Continued research on viral ocular tropism, inflammatory pathways, and early treatment strategies is essential to preventing similar outcomes in Lassa fever survivors.

Clinical Implications

- Early ophthalmologic screening should be incorporated into Lassa fever management protocols, particularly in patients with coagulopathy or visual complaints.
- Post-discharge follow-up is critical, as vision-threatening complications may evolve weeks to months after recovery from the systemic disease
- Multi-disciplinary collaboration—including infectious disease specialists, ophthalmologists, and public health teams—can improve awareness, timely diagnosis, and management of ocular sequelae.
- Access to specialized eye care must be strengthened, with subsidized pathways for survivors who may require surgical treatments but face financial constraints.
- Surveillance systems for Lassa fever survivors should monitor not only auditory and neurological deficits but also visual function, to better estimate the true burden of ocular morbidity.
- Health professionals should be aware of the potential of visual impairment in survivors, ensuring early ophthalmological assessment, and long-term follow-up for affected individuals' post-recovery. Further research is also needed to explore the exact mechanisms leading to optic and retinal damage, biomarkers of risk, as well as potential therapeutic interventions whenever an ocular complication occurs.

Recommendations:

Based on this case and existing evidence on ocular sequelae of Lassa fever, the following recommendations are proposed:

1. Routine Ophthalmologic Evaluation**:** All Lassa fever patients should undergo baseline eye examination during hospitalization, particularly those exhibiting haemorrhagic or neurological complications that may predispose to ocular injury.

2. Structured Post-Recovery Follow-up**:** Survivors should be enrolled in coordinated follow-up programs that include periodic visual assessments for early detection of delayed complications, as vision loss may progress after systemic recovery.

3. Improved Access to Specialist Care:
Strengthening referral systems and providing financial support for specialized ophthalmic services—including vitreoretinal care—can reduce preventable blindness in resource-constrained settings.

4. Integration into National Guidelines:
Clinical management protocols for Lassa fever should include specific algorithms for visual assessment and referral pathways to ensure standardized survivor care.

5. Capacity Building for Health Workers: Training on recognition of ocular symptoms in viral haemorrhagic fevers can improve early identification and timely management of eye complications.

Further Research:
Prospective studies are needed to understand viral persistence or tropism in ocular tissues, identify biomarkers for risk stratification, and evaluate therapeutic interventions such as corticosteroids or antivirals in preventing retinal damage.

Limitations:
The limitations identified were financial barrier which initially delayed the definitive surgery, hence confounding the outcome assessment. Another limitation was the lack of histology or viral PCR in ocular tissues. However, this report describes a single clinical case; therefore, the findings may not be generalizable to all Lassa fever survivors. Access to definitive ophthalmic treatment was delayed due to financial constraints, which may have influenced the visual outcome and limited the ability to evaluate the full therapeutic potential of timely surgical intervention Additionally, advanced diagnostic testing—such as polymerase chain reaction (PCR) or histopathologic evaluation of ocular tissues—was not performed, restricting insight into viral persistence or specific pathological mechanisms in the eye. These gaps highlight the need for more extensive clinical studies and improved survivor follow-up systems to better understand the ocular involvement in Lassa fever.

Acknowledgement:
The authors sincerely appreciate the medical, nursing, and supportive care teams at the Infection Control and Research Centre, Federal Medical Centre Owo, Ondo State, Nigeria, for their dedication to the management of the patient described in this report. We also acknowledge the contributions of the ophthalmology units involved in her follow-up and specialized care. Finally, we extend our gratitude to the patient for providing consent and allowing her experience to contribute to improved clinical understanding and care for Lassa fever survivors.

Conflict of Interest
The authors declare that there are no conflicts of interest related to this case report. No financial or personal relationships existed that could have influenced the work presented in this manuscript.

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