

Comparison of clinical and demographic characteristics and disability at 6-months post neurologic onset among Puerto Rico Guillain-Barré syndrome patients with and without evidence of Zika virus infection

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BACKGROUND

Guillain-Barré syndrome (GBS) is a post-infectious autoimmune disorder characterized by progressive weakness due to peripheral nerve damage.

Increased GBS incidence has been reported in countries affected by Zika virus, a flavivirus transmitted primarily by *Aedes* species mosquitos.

In February 2016, Puerto Rico Department of Health and CDC implemented a surveillance system to identify GBS cases during a Zika virus epidemic.

Data were analyzed to describe GBS patients with evidence of Zika virus infection.

METHODS

GBS cases were identified using two methods:

- 1) **Passive Surveillance:** Healthcare providers reported suspected cases by submitting case report forms.
- 2) **Retrospective evaluation:** All Puerto Rico non-specialized hospitals (N = 57) and two rehabilitation centers provided a list of patients who had been hospitalized during 2016, and who had an International Classification of Disease, 10th revision (ICD-10) code for GBS (G61.0) in the medical record.

For all identified cases, medical chart review was performed following hospital discharge or >28 days post neurologic illness onset for patients who remained hospitalized.

All GBS patient specimens (i.e., serum, urine, CSF, and saliva) were tested for evidence of Zika virus infection by RT-PCR; serum and CSF were also tested by IgM ELISA.

Telephone interviews collected disability data at approximately 6-months post neurologic onset. Disability was assessed using: Modified Rankin Score, Overall Disability Sum Score, and Facial Disability Index.

Frequencies for demographic, acute neuropathy, and long-term disability variables were calculated. Pearson chi-square, Fisher exact tests, and chi-square partitioning were used to compare categorical variables and median two-sample tests were used to compare continuous variables between confirmed GBS cases with (n = 71) and without (n = 36) evidence of Zika virus infection.

Case Definition: GBS

Cases meeting the Brighton Collaboration criteria for GBS diagnostic certainty levels 1–3 were confirmed cases (Sejvar et al 2011).

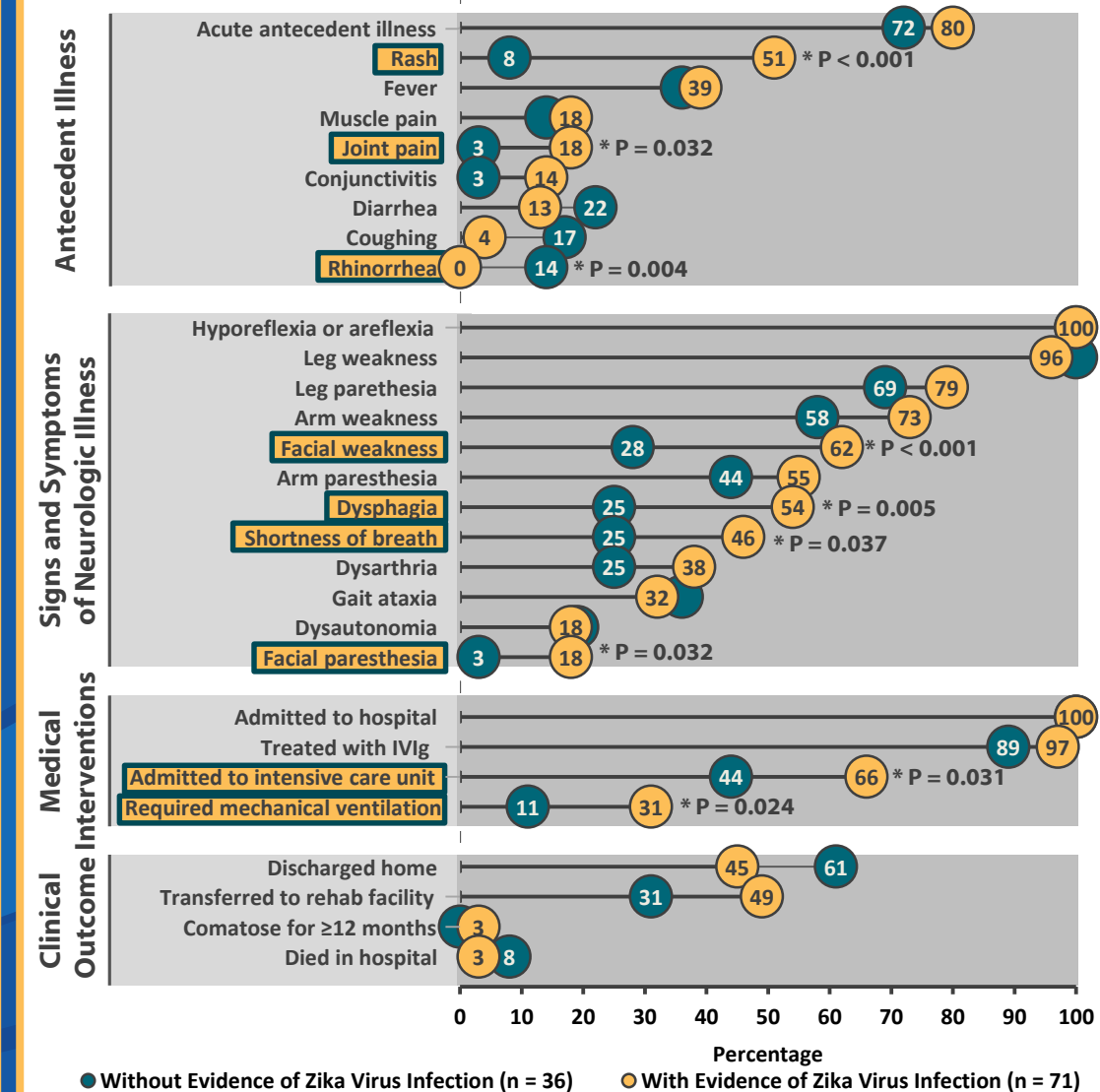
Case Definition: Evidence of Zika Virus Infection

- With Evidence of Zika virus infection:** Persons positive for Zika virus by RT-PCR and/or IgM ELISA in any specimen submitted.
- Without Evidence of Zika virus infection:** Persons negative for Zika virus by RT-PCR and IgM ELISA in all specimen submitted.

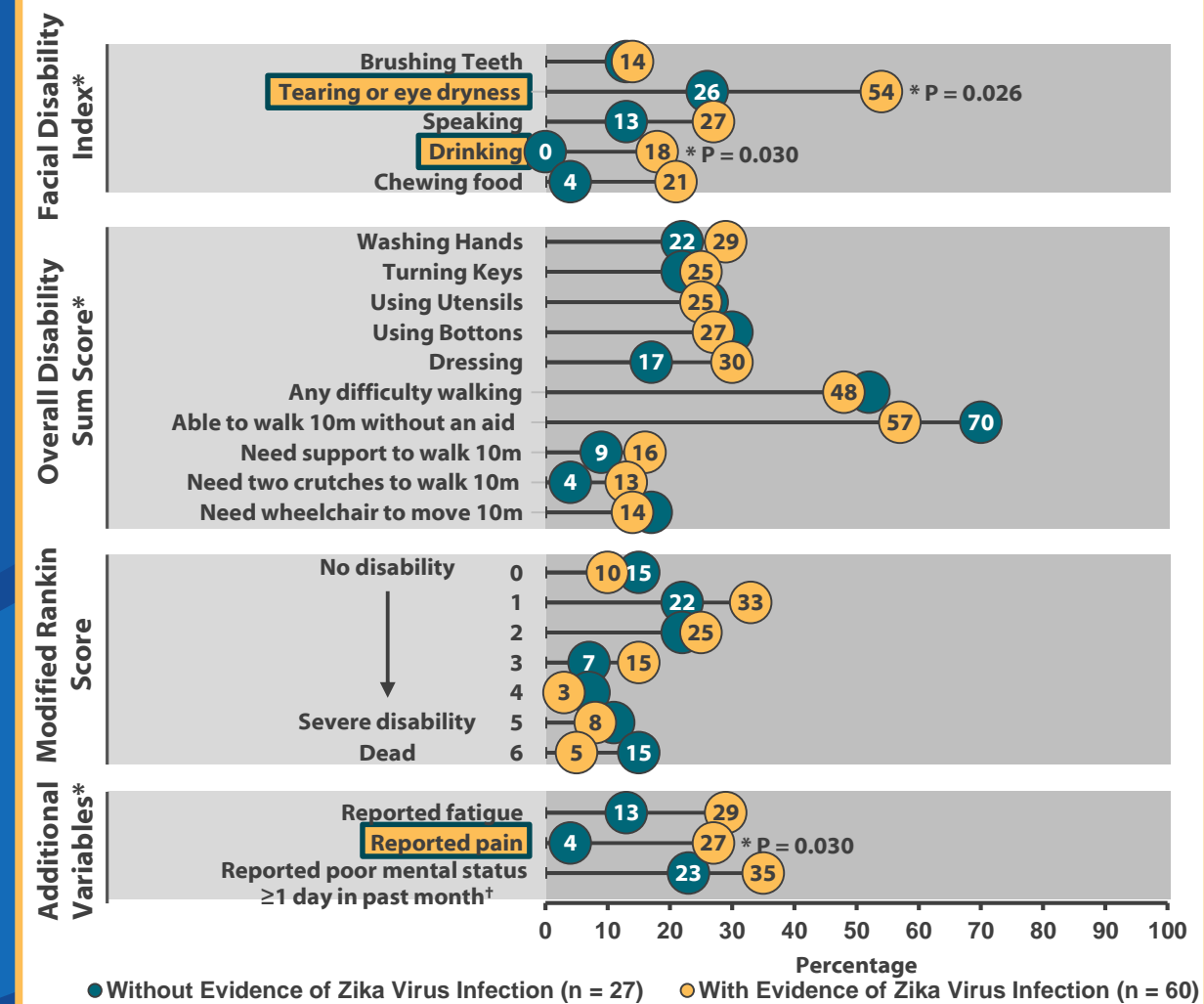
RESULTS: DEMOGRAPHIC AND TIME STEPS

	With Evidence of Zika Virus Infection n = 71 n (%)	Without Evidence of Zika Virus Infection n = 36 n (%)	P-Value
Age (years)			
Median (range)	55 (21–88)	49 (4–83)	0.249
Sex			
Female	37 (52)	10 (28)	0.017
Time step median duration (days)			
Antecedent illness to neurologic illness onset (range)	7	7 (0–15)	0.901
Neurologic illness onset to clinical nadir (range)	7	9 (1–28)	0.230
Neurologic illness onset to lumbar puncture (range)	9	8 (1–34)	0.646
Hospitalization (range)	12	10 (2–90)	0.402

RESULTS: ACUTE NEUROPATHY



RESULTS: DISABILITY



* Does not include 3 cases with and 4 cases without evidence of Zika virus infection that died after acute stage hospitalization and one case with evidence of Zika virus infection that remained comatose at 6-months post neurologic onset.

† Does not include 5 cases with and 1 case without evidence of Zika virus infection with no reported information on mental health.

	With Evidence of Zika Virus Infection n = 71	Without Evidence of Zika Virus Infection n = 36	P-Value
Disability at nadir			
Modified Rankin Score			
Median score (range)	5 (2–6)	5 (3–6)	0.389
Disability at approximately 6-months			
Modified Rankin Score			
Median score (range)	2 (0–6)	2 (0–6)	0.473
Facial Disability Index*			
Median score (range)	95 (25–100)	100 (55–100)	0.131
Overall Disability Sum Score*			
Median score (range)	3 (0–12)	3 (0–12)	0.947

CONCLUSIONS

Identification of GBS patients with and without evidence of Zika virus infection allowed for comparable patient populations to better characterize GBS associated with Zika virus infection through statistical analyses.

GBS patients with evidence of Zika virus infection were clinically similar to those without evidence of Zika virus infection.

GBS patients with evidence of Zika virus infection were more likely to:

- Be female
- Have rash and joint pain during antecedent illness
- Have facial weakness, dysphagia, shortness of breath, and facial paresthesia during acute neuropathy
- Be admitted to the intensive care unit and require mechanical ventilation during acute neuropathy
- Report abnormal tear production and difficulty drinking at 6-months post neurologic onset

Pathophysiologic investigations should examine potential Zika virus autoimmune response preferential effect of cranial nerves among GBS patients.

Countries affected by Zika virus should appropriately prepare hospital and rehabilitative resources to improve GBS patients' long-term prognosis.

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