

Persons with onchocerciasis-associated epilepsy and nodding seizures have a more severe form of epilepsy with more cognitive impairment and higher levels of *Onchocerca volvulus* infection

Gasim Abd-Elfarag¹, Jane Y. Carter², Stephen Raimon³, Wilson Sebit⁴, Abozer Suliman⁵, Joseph Nelson Siewe Fodjo⁶, Peter Claver Olore⁷, Kai Puok Biel⁵, Morrish Ojok⁷, Makoy Yibi Logora⁸, Robert Colebunders⁶

¹ Global Child Health Group, Department of Paediatrics and Department of Global Health, Academic Medical Center, University of Amsterdam, The Netherlands

² Amref International University, Nairobi, Kenya

³ Maridi State Hospital, Maridi, Republic of South Sudan

⁴ National Public Health Laboratory, Republic of South Sudan

⁵ Maridi Health Sciences Institute, Maridi, Republic of South Sudan

⁶ Global Health Institute, University of Antwerp, Belgium

⁷ Amref Health Africa, Juba, Republic of South Sudan

⁸ Neglected Tropical Diseases Unit, Ministry of Health, Juba, Republic of South Sudan

Comparison of persons with epilepsy (PWE) with and without nodding seizures in onchocerciasis- endemic villages in Maridi, South Sudan

	PWE without nodding seizures n=144	PWE with nodding seizures n=158	<i>P-value</i>
Age in years (IQR)	17.5 (15.8-20.0)	16.0 (12.0-18.0)	<0.001 ^a
Age of epilepsy onset (IQR)	12.0 (9.0-14.2)	9.0 (7.0-11.0)	<0.001 ^a
Microfilarial density (IQR)	9.4 (3.5-21.8)	14.9 (7.5-26.0)	0.001 ^a
Seizure frequency (IQR)	2.0 (1.3-12.0)	60.0 (4.0-90.0)	<0.001 ^a
Rankin disability score (IQR)	1.0 (1.0-1.0)	1.0 (1.0-2.0)	<0.001 ^a
Cognitive impairment: n (%) ⁱ	44 (30.8)	72 (45.6)	0.008 ^b
Presence of nodules: n (%) ⁱⁱ	1 (0.7)	9 (5.8)	0.020 ^c
Dermatological lesions: n (%) ⁱⁱⁱ	21 (15.6)	48 (33.1)	<0.001 ^b
Muscle wasting: n (%) ^{iv}	25 (17.7)	63 (40.1)	<0.001 ^b
Stunting: n (%) ^v	7 (7.5)	14 (10.4)	0.451 ^b

IQR: Interquartile range; AED: Antiepileptic drug

^a*Mann Whitney u test*

^b*Chi-Square test*

^c*Fisher exact test*

ⁱ1 missing data; ⁱⁱ2 missing data; ⁱⁱⁱ22 missing data; ^{iv}4 missing data; ^v73 missing data

Persons with epilepsy and nodding seizures

- have a more severe form of onchocerciasis-associated epilepsy
- have more frequent seizures
- have more disabilities
- are more often cognitively impaired
- develop epileptic seizures at a younger age
- present a higher level of *O. volvulus* infection

Criteria onchocerciasis-associated epilepsy

- Onset of seizures at between 3 and 18 years of age
- >3 years of residence in an onchocerciasis-endemic village with high epilepsy prevalence and household clustering of epilepsy
- Normal psychomotor development prior to seizure onset
- No obvious cause of epilepsy
- Arguments in favour: nodding seizures and/or severe unexplained stunting with delayed or absence of external signs of sexual development, or presence of persons with such features in the village