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High prevalence of epilepsy in two rural villages in Mahenge area, Tanzania: after 20 years of community directed treatment with ivermectin

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Background

- Epilepsy prevalence is highest in low and middle income countries
- Onchocerciasis is a parasitic disease caused by the worm *Onchocerca volvulus* transmitted by blackflies.
- Estimated 37 million people are infected worldwide, 99% in Africa.
- Onchocerciasis is treatable by prolonged ivermectin treatment, which kills the microfilariae.
- WHO enlisted Onchocerciasis as a priority disease targeted for elimination by 2025.



Objective

To investigate whether Community directed treatment of ivermectin (CDTi) decreases the incidence of epilepsy in the Mahenge mountains, an onchocerciasis endemic region in Tanzania known to have a high prevalence of epilepsy

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Prevalence and Incidence of Epilepsy in Ulanga, a Rural Tanzanian District: A Community-Based Study

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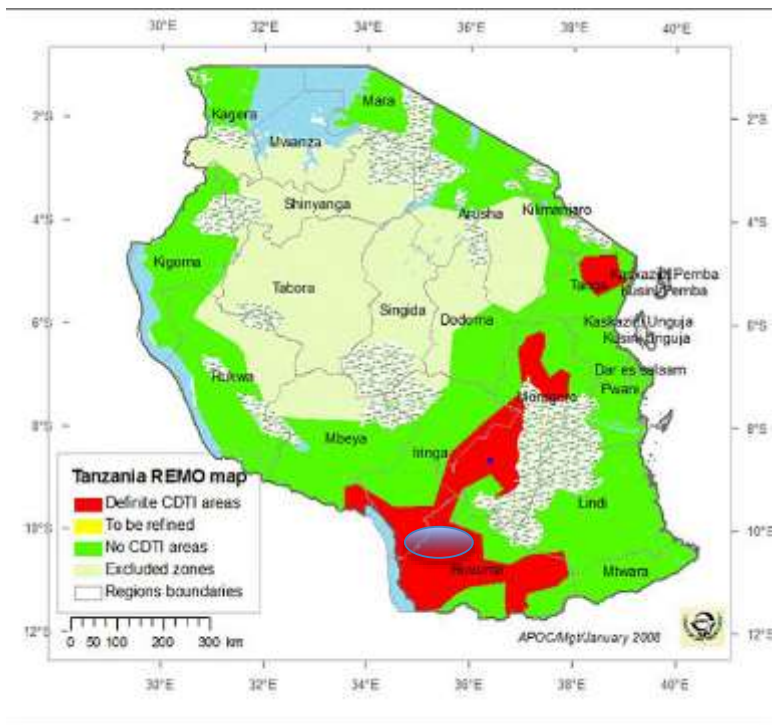
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1988 Epilepsy Prevalence: 5.1-37.1/1000
Incidence: 73.3/100.000



Methods



Name of Village	Population size	Number of Epilepsy cases	Prevalence
Mdindo	539	20	3.71
Vigoi	1822	23	1.26
Total	2361	43	1.82

Methods

- Door-to-door households visits:
 - Enumerate the village population and collect information ivermectin use
 - Identify individuals suspected to have epilepsy
 - 5 validated questions
 - Test children (6-10 years) for *onchocerca* antibodies (OV16 rapid test)
- Identified epilepsy suspects:
 - Referred to neurologist for further examination
 - Referred individuals tested with the OV16 rapid test

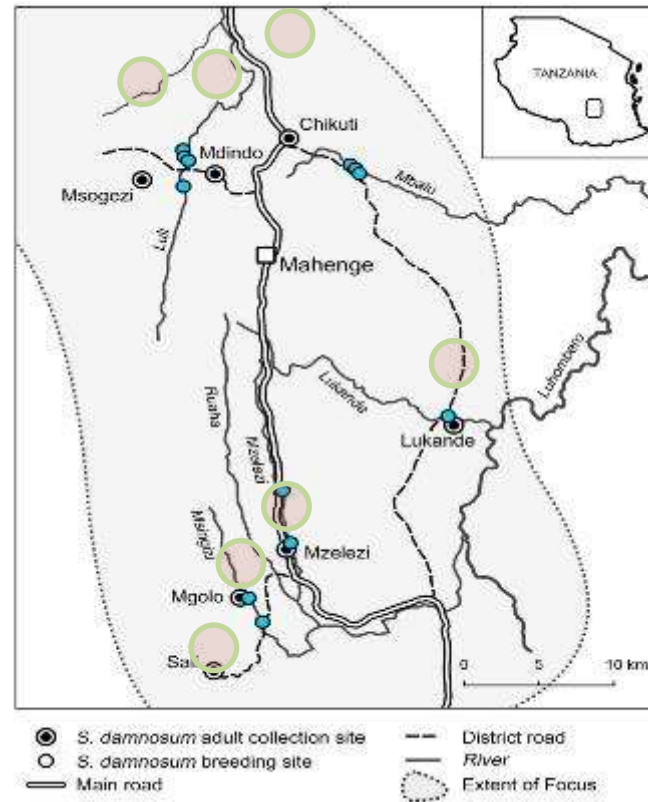
Results

Village	Population enrolled					
	Total	Males (%)	Screened +ve (%)	No. examined (%)	Epilepsy cases (%)	χ^2 -test (p-value)
Matumbala	972	431 (44.3)	44 (4.5)	44(100)	16(1.65) 1.26 ^a	-
Vigoi	1646	741(45.0)	50 (3.04)	49(98.0)	23 (1.40) 1.26 ^a	0.26(0.612)
Mdindo	941	447(47.5)	56 (5.9)	55(98.2)	33 (3.51) 3.71 ^a	6.63(0.010)
Msogezi	1558	774(49.7)	94 (6.0)	91(96.8)	55 (3.53)	7.79(0.005)

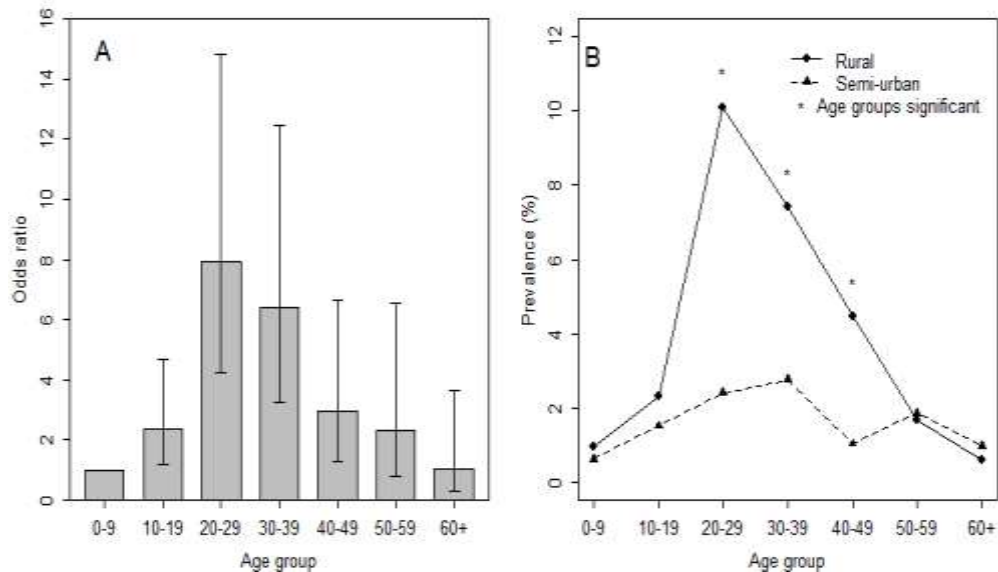
O. volvulus present in *S. damnosum* s.l. at all adult sites.

- **2016: 0.57%** (95%CI: 0.43% - 0.74%) of *S. damnosum* s.l. possessed infective L3 stage parasites in their heads.
- **0.68%** >20 years ago

Location	Alt.	No. Days	Total Catch	No. Pooled	No. Pools*	<i>O. volvulus</i> +ve		Infection Rate (Heads)			
						Bodies	Heads	L3**	95% CI -/+		
Msogezi	603m	17	4273	2056	16	11	6	0.37%	0.13%	0.83%	
Mdindo	548m	17	4157	3210	25	25	15	0.72%	0.38%	1.26%	
Chikuti	459m	17	3001	2681	27	27	8	0.36%	0.14%	0.72%	
Mgolo	465m	17	2589	2164	15	15	7	0.43%	0.16%	0.92%	
Mzelezi	333m	17	1812	1423	11	11	6	0.62%	0.21%	1.43%	
Sali	876m	12	672	614	6	6	5	1.65%	0.46%	4.23%	
Lukande	355m	12	407	304	4	2	4	-	-	-	
			Total	16943	12452	104	97	51	0.57%	0.43%	0.74%



Epilepsy cases by age groups



Risk of epilepsy by age group when adjusted by study village (A) and prevalence of epilepsy by age group and strata (B)

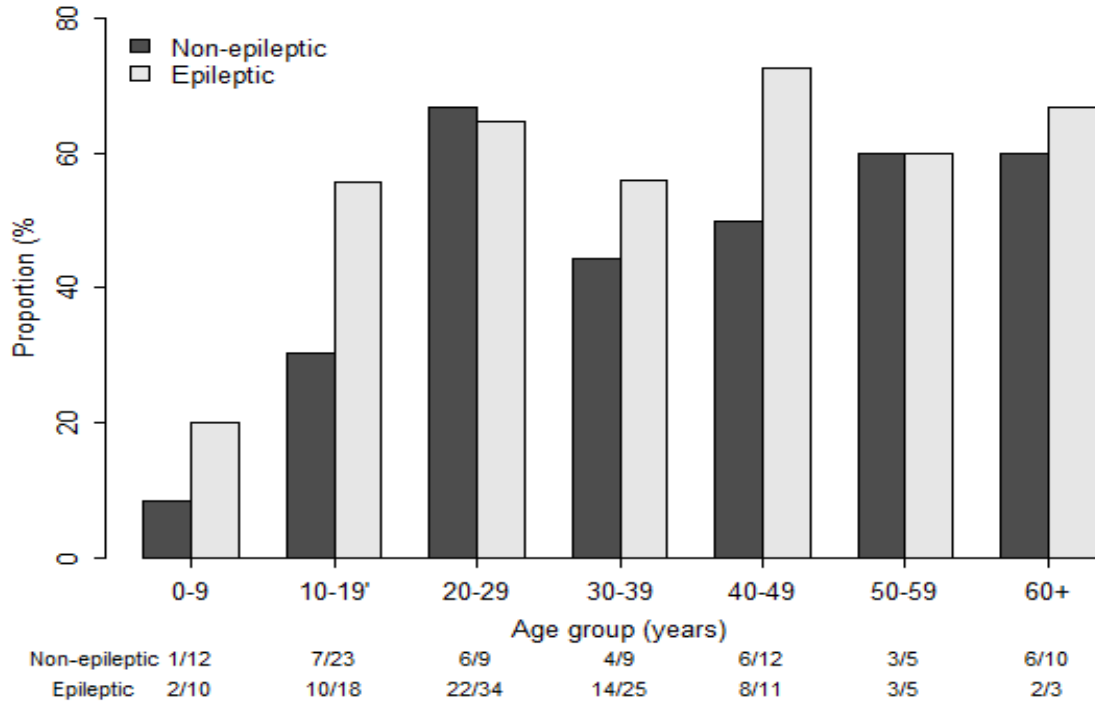
- The risk of epilepsy increased with increasing age until the age group 20–29 years and declined thereafter
- Higher prevalence of epilepsy in rural at age groups 20–29 to 40–49
- Individuals aged 20–29 in the rural had the highest prevalence (10.1%), which declined rapidly with age
- Multiple cases of epilepsy per household by village

5 year period and incidence of epilepsy per 100,000 per year

	Overall Population		
Village	Current population size (n)	# new cases	Incidence rate (95%CI)
Matumbala	972	4	86.3
Vigoi	1,646	8	101.9
Mdindo	941	5	111.4
Msogezi	1,558	10	134.6
Total	5,117	27	111 (73–161)

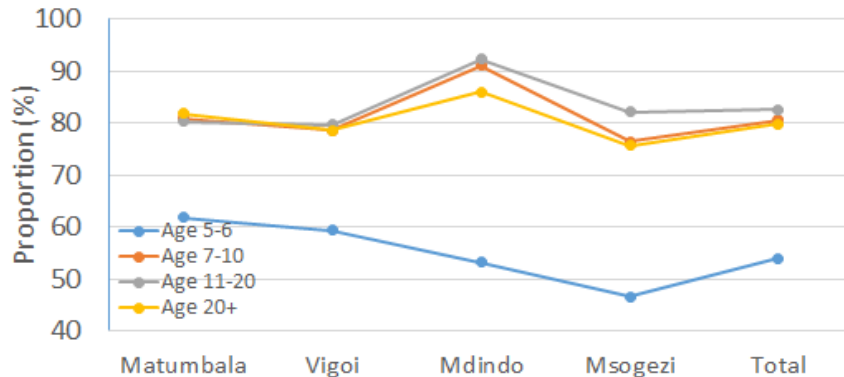
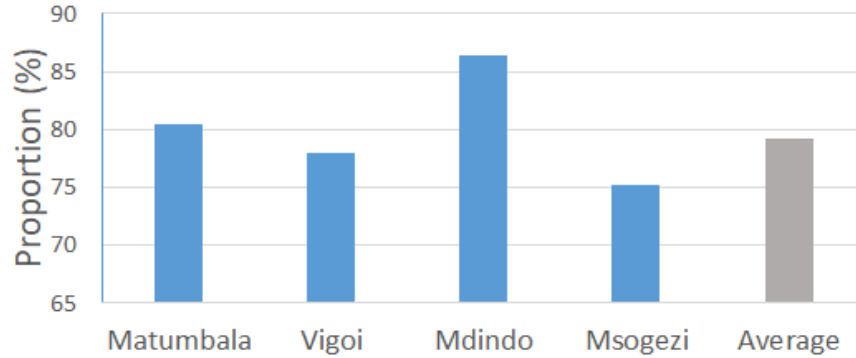
5 year period preceding the survey: IR=111 (95%CI: 73– 161) per 100 000 pys

Distribution of OV16 positivity



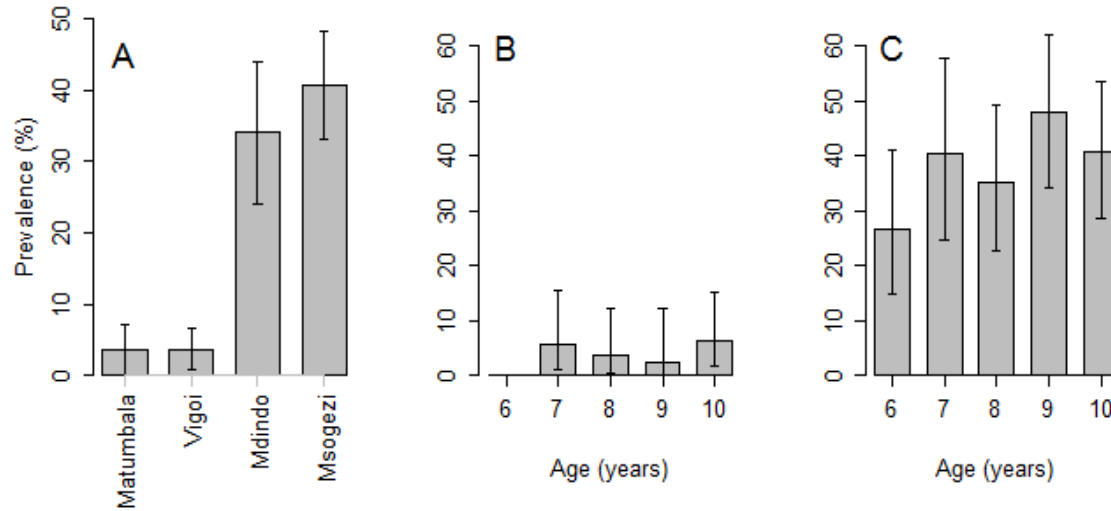
Prevalence of OV16 positive tests was higher in epilepsy patients (57.9% vs. 41.25%), $p=0.025$

Ivermectin coverage in individuals aged ≥ 6 years



- High coverage ($>80\%$) in Mdindo and Matumbala
- Low coverage in Msogezi
- Low coverage in children 5-6 year

OV16 results in children (6-10 years)



- 530 children were tested for *O. volvulus* IgG4 antibodies
- The prevalence of OV16 positive tests: 20.7%
- Higher prevalence in rural (38.4%) than semi-urban (3.4%) villages ($p < 0.001$).
- Prevalence increased with age in rural villages

Conclusion

- High prevalence of epilepsy in rural villages in Mahenge similar to 1988
- High prevalence of OV16 positive serology in children
- High active onchocerciasis transmission despite ~20 years of CDTi
 - Ivermectin treatment coverage data not reliable?
 - Resistance against drug?
- **Need to review onchocerciasis control strategy: larviciding rivers?**



Acknowledgements

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