IMPROVING EPILEPSY MANAGEMENT IN SUB-SAHARIAN AFRICA PRIMARY CARE:

A TOOL TO FACILITATE EEG REPORTING FROM REMOTE

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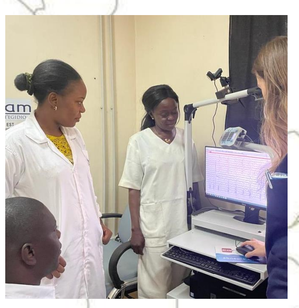
OBJECTIVES

Epilepsy is a major public health challenge in sub-Saharan Africa (SSA), where diagnosis and treatment are limited by the scarcity of neurological expertise and equipment. In 2019, the Disease Relief through Excellent and Advanced Means (DREAM) program, in collaboration with the Italian Society of Neurology and the C. Besta Neurological Institute, began supporting epilepsy care within SSA primary care systems. Video-EEG systems were installed in Malawi and the Central African Republic in 2021, and in Mozambique in 2023. EEG recordings are interpreted remotely by Italian neurologists via a dedicated telemedicine platform (Leone M. et al, 2018). To improve the EEG reporting, we developed a simplified reporting tool. The aim of this study was to evaluate the consistency of the tool.



MATERIALS & METHODS

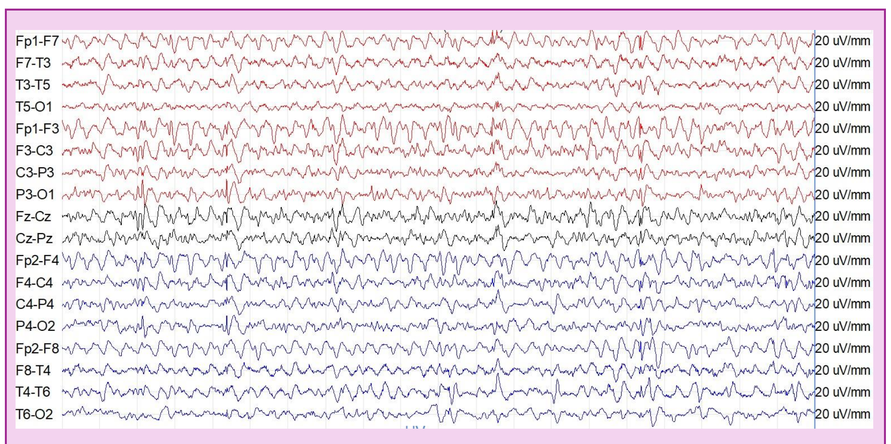
The EEG systems are integrated into the Global Health Telemedicine (GHT) platform (https://www.ghtelemedicine.org/site/). The GHT platform enables the secure transfer and remote review of EEGs by Italian specialists. To provide a standardized basic EEG description and reporting we selected simplified items to be checked on EEG reading. The items included:

- **Background activity (BA)** frequency, reactivity (physiological and reactive, slowed, and/or not reactive), and symmetry
- Presence and abundance of **slowing activity** (occasional or continuous)
- Presence, abundance (rare, frequent, or abundant), and distribution (focal, multifocal, diffuse, and/or generalized) of **interictal epileptiform discharges (IEDs)**
- Presence and type of **seizures** (with focal, generalized, or unknown onset)
- **Diagnostic conclusions** (normal, epileptic, encephalopathic, or pathological but non-epileptic).

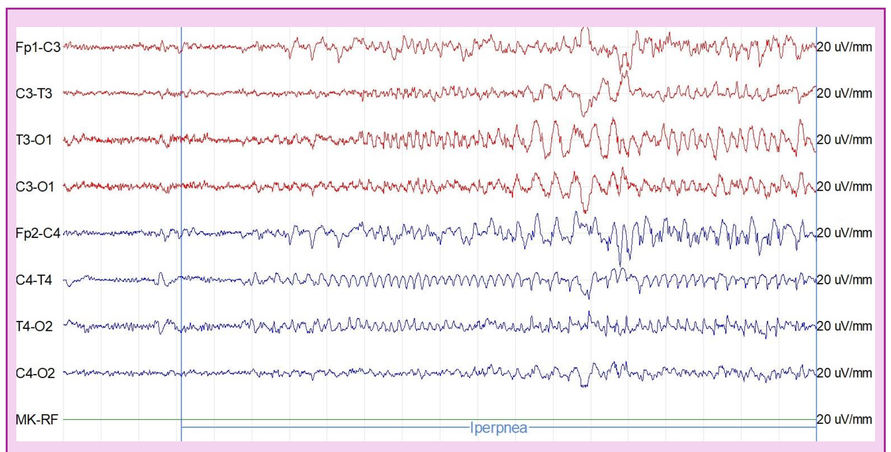
To test the tool, six expert neurologists independently reviewed an initial sample of 20 EEGs randomly selected among the 640 EEGs received during 2023 from the DREAM-Banguì center. Inter-rater reliability was assessed using Krippendorff's Alpha.

RESULTS

Among the 20 patients, 12 were females; the median age was 24 years. High agreement was observed for the presence and frequency of IEDs (α = 0.83). Diagnostic conclusions reached moderate-to-good agreement (α = 0.77), while BA frequency/reactivity showed moderate agreement (α = 0.63). BA symmetry and slowing patterns yielded lower agreement (α = 0.45 and 0.48, respectively).



CASE 2: Two neurologists evaluated the above EEG as "encephalopatic", while the other four described it as "epileptic" in their conclusions.



CASE 5: All six neurologists identified the occurrence of a focal seizure.

Variables	Krippendorff's *α*
BA frequency/reactivity	*0.63*
BA symmetry	*0.45*
Slowing activity	*0.48*
IED presence	***0.83***
IED frequency	***0.83***
Diagnostic conclusions	***0.77***

DISCUSSION

Substantial agreement was achieved for the diagnostic conclusions. We found excellent concordance in the identification of interictal epileptiform discharges. In contrast, the assessment of background activity and slowing activity showed greater variability. Moreover, the categories "encephalopathic" and "pathological but non-epileptic" may have introduced some ambiguity in the final classification. Future versions of the tool might benefit from more detailed diagnostic categories, distinguishing between "epilepsy without encephalopathy", "epileptic encephalopathy", and "non-epileptic encephalopathy" or "lesional patterns". Overall, the EEG reporting tool proved to be a reliable method for standardizing EEG interpretation.

CONCLUSIONS

A simplified and standardized EEG reporting tool, combined with telemedicine, offers a valuable approach to enhance diagnostic accuracy and training for clinicians in SSA. Its uniform structure may contribute to more consistent epilepsy care and support long-term capacity building in underserved areas.

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