The prevalence of essential tremor in rural northern Tanzania

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Abstract

Introduction Estimates of the prevalence of ET vary widely but there is little existing data on the prevalence of essential tremor (ET) in sub-Saharan Africa [1].

Patients and Methods A door-to-door community-based prevalence study of ET was carried out in the Hai district of northern Tanzania (n=161,071). The screening questionnaire was followed by examination of positive responders and backed up with other case finding methods.

Results 222 patients responded positively to the screening questions and 43 were referred by village elders. 65 (38 were male and 27 female) were diagnosed with ET. Mean age was 72 years and mean duration of symptoms was 11.3 years. The crude prevalence rate was 41/100,000 and age-standardised prevalence compared to the UK population (2001) was 82/100,000.

Discussion This is the first community-based prevalence study of ET in sub-Saharan Africa. Previous data from community-based neurological surveys showed lower prevalence rates of 5/100,000 in Ethiopia and 10/100,000 in Nigeria. Non-selective beta blockers are available locally and are affordable, yet none of these patients had previously been on any treatment.

Introduction

The prevalence of essential tremor (ET) in previous studies has ranged from 0.05 [2] to 220/1000 of the population [3]. A recent study in Italy reported age- and sex-adjusted prevalence rates of 1.2% for females and 1.9% for males [4]. The previous studies in sub-Saharan Africa (SSA) were investigating all neurological diseases, not just ET. Two cases were reported in Nigeria from a population of 20,000 giving a crude prevalence rate of 10/100,000 [5] and 3 cases in Ethiopia [2] in a population of nearly 61,000 giving a crude prevalence rate of 5/100,000. Age-standardisation of rates were not reported.
It has been the focus of recent reports that neurological disease in SSA is a somewhat neglected topic and that little data exist on the burden of disease [6]. There are very few consultant neurologists to serve this huge population [7] (2 for 36.5 million people in Tanzania), meaning that the large majority of disease burden is likely to be undiagnosed. Hospital based studies detect only the tip of the iceberg: a study by Bower et al [8], found only 9 cases of ET in a series of patients from a University hospital neurology clinic in Ethiopia over one year. This is likely to be due in large part to poor access to hospital services for the majority of this population, but also because people who are not limited by their symptoms do not seek help.

We carried out a door-to-door community based study in a population of approximately 161,000 people in rural Tanzania.

**Patients and methods**

The Hai district of northern Tanzania has been a disease surveillance site (DSS) for almost 20 years. Initially it was selected to be representative of a rural, more affluent Tanzanian population for the Adult Morbidity and Mortality Project (AMMP), organised by a partnership between the Tanzanian government and Newcastle University, UK. More recently it has been the site of a stroke incidence study (TSIP) [9] and reliable up to date demographic data exist. The Hai DSS has been described previously [10]. At the beginning of the study a census was carried out and along with this a screening questionnaire to detect tremor.

Ethical approval was obtained from the National Institute of Medical Research in Tanzania and the Newcastle and Northumberland Joint Ethics Committee.

The following screening questions were used to detect potential cases of ET:

- Do your arms or legs shake, apart from maybe when you have drunk alcohol?
- Does your head shake?

Four further questions were asked to try and specifically detect Parkinsonism:

1. Has anyone ever told you that you have Parkinson's disease?
2. Do you shuffle your feet and/or take tiny steps when you walk?
3. Do you move more slowly than other people your age?
4. Do you have difficulty standing up, or fall easily apart from maybe when drinking alcohol?

All people responding positively to either of these questions were examined by the research doctor, either in their own home or at a local dispensary. In addition, other overlapping methods of case ascertainment were used. These
were: village elder reporting of people with tremor that had not responded positively to the screening questions and review of neurology out patient clinic lists of an Irish consultant neurologist who had recently worked at the local consultant referral hospital, Kilimanjaro Christian Medical Centre (KCMC).

ET was diagnosed in patients with a postural or kinetic tremor of the upper limbs, and / or an isolated head tremor, with no other focal neurology [11]. Information was collected on asymmetry of tremor, resting component, response to alcohol, family history of tremor (in first degree relatives), duration of symptoms and medication.

Results

The population of the Hai DSS in August 2005 was 161,071. Two hundred and twenty-two people answered positively to having a tremor in their limbs or head or both of whom, 50 were diagnosed with ET. Forty-three could not be examined for the following reasons: 23 had moved out of the area, 13 had died, 6 refused to be seen and 1 could not be traced. The others (false positives) were diagnosed with Parkinson’s disease (20), enhanced physiological tremor (7), cerebellar dysfunction (4), drug-induced Parkinsonism (3), tic (2), tremor secondary to salbutamol (1) and orthostatic tremor (1). Six patients had a history of alcohol excess. In 81 patients no tremor was visible at the time of examination and no diagnosis could be reached. Village elders referred a further 43 patients, of whom 15 had ET, 6 had PD and 22 had an alternative diagnosis. No new cases of ET were identified from the neurology outpatient list.

Table 1 describes the cases of ET detected. Thirty-five patients had head tremor (14 male, 21 female), which was significantly more common in women (p=0.002). Tremor affected the arms (80%), head (54%) or both (33%).

<table>
<thead>
<tr>
<th>Number of cases</th>
<th>65 (Male 38)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number previously diagnosed / treated</td>
<td>0</td>
</tr>
<tr>
<td>Mean age (range) (years)</td>
<td>72 (40-96)</td>
</tr>
<tr>
<td>Mean age at onset of symptoms (standard deviation) (years)</td>
<td>60 (18.5)</td>
</tr>
<tr>
<td>Number of cases with head tremor</td>
<td>35% (21 female)</td>
</tr>
<tr>
<td>Percentage with a positive family history</td>
<td>28%</td>
</tr>
<tr>
<td>Response to alcohol</td>
<td>34%</td>
</tr>
<tr>
<td>Asymmetry of upper limb tremor</td>
<td>37%</td>
</tr>
<tr>
<td>Resting component to tremor</td>
<td>19%</td>
</tr>
</tbody>
</table>

*Table 1: Characteristics of patients with essential tremor*
The crude prevalence rate of ET in Hai DSS, Tanzania was 41/100,000 (men and women combined). Age standardised to the UK population (2001) this was 82/100,000 (combined). Age-standardised prevalence rates for men and women were 105/100,000 (95% confidence intervals (CI) 71-139) and 64/100,000 (CI 39-88) respectively. The number of cases in each five year age band can be seen in graph 1.

*Graph 1:* Number of cases of essential tremor by five-year age bands
Discussion

This is the first large scale community based prevalence study of ET in SSA. The age-standardised rates of ET in Hai are higher than previously reported from SSA, but lower than the developed world. Strengths of the study are that all patients were examined by the same research doctor and that a door-to-door community based approach was used. More than one method was used to detect as many cases as possible.

Our figures are likely to be an underestimate as people with mild symptoms may not have responded positively to the screening questions. In an American study, 13 of 46 patients diagnosed with ET had not reported tremor on the screening questions [12]. Louis et al [13] reported that patients with mild tremor may not screen positively, stressing the importance of examining all subjects if possible. Individuals who did not have tremor at the time of the one-off examination were excluded. Limitations to the study are that we did not use video taped examination of all patients to confirm diagnosis independently by a second physician. We did not examine any one who screened negatively unless they were referred by the village elders.

There has been previous discussion about ethnic variation in the prevalence of physician diagnosed ET in the USA [14], where Caucasians were five times more likely that African Americans to have physician diagnosed ET. It was unclear from this study whether this reflects inconsistencies in access to medical care and health seeking behaviour of different communities, or whether a true difference in prevalence exists. Another study in New York showed higher rates in whites than African Americans, with Hispanics having an intermediate prevalence [12]. A study from China reported low prevalence rates of ET: crude rates of 11/100,000 and age-adjusted rates (to the 1960 USA population) of 15/100,000 [15]. However, a more recent Singaporean study reported age-standardised rates of 237/100,000 (standardised to UICC world standard population) [16].

A large number of patients may have undiagnosed ET in the community. In prevalence studies from Finland [17] and Singapore [16] only 2% and 10% respectively had been previously diagnosed. From a teaching hospital in Nigeria it was reported that over 25 years and 2.1 million patients seen, only 10 cases of ET were recorded in out patient clinics [18]. Several studies have suggested ET is more common in men than women [4, 12, 16, 17], but an older, community-based study in Papua New Guinea suggested women were more commonly affected than men [19].

Location of tremor in our patients was similar to that reported from other studies. Upper limb tremor was most common (80% of cases), followed by head tremor (54%). Louis et al [12] reported 73% of patients had arm tremor and 27% had arm and head tremor. Some patients with more severe tremor did have a resting
component (18.5%). In previous studies up to 1 in 5 patients with ET have been reported to have a resting component [20]. Head tremor was significantly more common in women (p=0.002) as has been reported in other studies [21, 22]. Tremor was asymmetrical in 37% of patients. A study from New York reported that mild to moderate asymmetry was common in patients with ET [23], with nearly 90% of patients having a small, but detectable difference between the two sides. Only a third of patients reported an improvement in their tremor in response to alcohol in comparison to 50% in a previous study [24], but as 25% of our group did not drink alcohol at all, nearly half of those that did drink alcohol noted some improvement. Less than a third of patients (28%) reported a positive family history of tremor. In some cases the first degree relatives had died at a young age making it possible that they may have developed tremor had they lived long enough. It is difficult to get accurate data on family history in essential tremor. One study [25] reported the inaccuracy of using this method, with patients tending to under-report family members with tremor, especially in mild cases, resulting in a sensitivity of only 43%. However, the specificity of these reports were high (94%), so if a family member is recorded as having a tremor, they probably do have ET.

Patients suffered from stigma surrounding their tremor. This may have made them less likely to come forward for the study. Some suggested that tremor was a sign of alcoholism and others felt it was a sign of something more sinister such as evil spirits. No one was on medication for tremor and very few had sought any medical help.

In a community with high rates of poverty, work days and productivity lost to illness is a tragedy, especially when it is due to something treatable. In one study in the UK 25% of patients with ET had to change jobs or retire because of their symptoms [24]. Social stigma as a result of neurological problems is common in Tanzania and awareness of neurological conditions is low, as in most of SSA. The social and emotional burden could be partially relieved with treatment. To make progress, further consideration of local beliefs behind such conditions is necessary, as is education of the population and community health workers.

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References

Graph 1: Number of cases of essential tremor by five-year age bands