

## Absence of hot water epilepsy among Indian epilepsy patients In Malaysia

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### **Abstract**

*Background and Objective:* Hot water epilepsy is a unique form of reflex epilepsy described mainly in South India, with reported prevalence of up to 6.9%. Genetics is thought to be important in the pathogenesis. Malaysia is a multiracial country with 7.7% ethnic Indian population who are mainly descendents of migrants from South India. This study aims to determine the prevalence of hot water epilepsy among the Indian epilepsy population in Malaysia. *Methods:* Indian epilepsy patients attending the Neurology clinic at University Malaya Medical Centre and Hospital Kuala Lumpur were interviewed with a structured questionnaire. *Results:* A total of 189 patients were recruited. The mean age was 33.2 years, the mean duration of epilepsy was 14.4 years. The Male: Female ratio was 9:11. A third of the cases were idiopathic and the remaining were remote symptomatic or cryptogenic. The ethnic distribution was: Tamils (72%), Malayalee (11%), Punjabis (5%), Telegus (5%) and Ceylonese (5%). Parental consanguinity was noted in 23% of the respondents. Sixty one percent of the respondents had various seizure precipitants. However, none had their seizures induced by hot water shower or bath. All the respondents were unaware that hot water can induce seizure and 64% regularly took shower or bath using hot water.

*Conclusion:* This study did not find any case of hot water epilepsy among Malaysian patients largely of South Indian descent. Factors other than race and genetics may determine the prevalence of hot water epilepsy.

### **INTRODUCTION**

Hot water epilepsy is a unique form of reflex epilepsy. The epilepsy is precipitated by the stimulus of bathing with hot water poured over the head. The largest number of hot water epilepsy has been reported from South India. It has been said that in Southern India, it is customary to bath everyday. However, washing of the head is done generally every 3-15 days. During the bath, mugfuls of hot water is poured from a bucket in quick succession directly over the body or the head. The temperature of the hot water used ranges between 40-50°C. The seizures are of complex partial type with or without secondary generalized tonic-clonic seizures. The seizures induced could occur at the beginning or at the end of the bath. It usually lasted a few minutes. Spontaneous non-reflex epilepsy was reported a few years later in 16-38%. Interictal scalp electroencephalography is usually normal.<sup>1-6</sup> The reported prevalence of hot water epilepsy is 3.6% of epilepsy clinic, and 6.9% of a community survey in Bangalore, Karnataka, South India.<sup>4,6</sup> A

recent report from Turkey estimated a prevalence of hot water epilepsy in 0.6% of patients in epilepsy clinic.<sup>7</sup> Hot water epilepsy has also been reported from Japan and elsewhere.<sup>8-10</sup> A family history of epilepsy has been reported in 7-25% of the patients.<sup>2,4,7</sup> The pathophysiology of the disease has been attributed to aberrant thermoregulation with rapid rise in body temperature secondary to hot water in the susceptible individuals. The occurrence of febrile seizure in childhood results in “hyperthermic kindling” has also been postulated.<sup>4,6,11,12</sup>

Malaysia is a multiracial country consisting mainly of Malays, Chinese and Indians. According to the year 2000 census, the Indians accounts for 7.7% of the 21.9 million Malaysians. The great majority of Malaysian Indians are descendents of immigrants from the Southern Indian states, Tamil Nadu, Kerala and Andhra Pradesh, and Sri Lanka. This study aims to estimate the prevalence of hot water epilepsy among the Malaysia Indian epilepsy population in the neurology clinics.

## METHODS

Epilepsy patients of Indian origin who attended the neurology clinic in the two largest government hospitals in Kuala Lumpur, the University Malaya Medical Centre and the Kuala Lumpur General Hospital were recruited. The study was conducted from December 2001 to May 2002. The patients or the care givers were interviewed by the author (VR) using a structured questionnaire. The questionnaire contain questions related to demographic features, seizure history, seizure precipitants, awareness of hot water epilepsy, and family history. For statistical analysis, the data was analyzed using SPSS version 3.0.

## RESULTS

A total of 189 cases were studied. The mean age of the patients was 33.2 years (range: 2 months to 92 years). The mean duration of epilepsy was 14.4 years (range: 6 months to 53 years). Forty eight percent of the patients were females. Twenty seven percent 27% of the epilepsies were idiopathic, and the remaining were remote symptomatic or cryptogenic. The mean frequency was 10 seizures per year.

The maternal and paternal ethnicity is as listed in Table 1. As shown, 88-90% of the patients were of South Indian states of Tamil Nadu (Tamilians), Kerala (Malayalees), and Andra Pradesh (Telugu). The others were from Punjab (Punjabis) and Sri Lanka (Ceylonese). Parental consanguinity was seen in 23% of the cases. Of the patients with parental consanguinity, 13% was between cousins, 13% had uncle-niece marriage, 76% were uncertain of the relationship. Family history of epilepsy was seen in 14% of the patients with parental consanguinity.

**Table 1: Parental ethnicity of the ethnic Indian patients with epilepsy**

	Maternal ethnicity	Paternal ethnicity
Tamilian	72%	72%
Malayalees	11%	9%
Telegus	7%	7%
Ceylonese	5%	7%
Punjabis	4%	4%
others	1%	
Total	100	99

Seizure precipitants were seen in 64% of the patients. Of these, 38% had single precipitant, 29% had two precipitants and 19% had three precipitants, and the others 4 or more precipitants. The precipitants were mental stress (32%), tiredness (25%), and lack of sleep (22%), fever (11%), physical stress (9%), "heatiness" (7%), food (6%), menses (6%) and television (4%).

All the patients were unaware of hot water able to induce epilepsy and 64% took hot water bath regularly. None of the patients had hot water epilepsy.

## DISCUSSION

According to the year 2000 census, Kuala Lumpur and its neighboring state of Selangor where the two hospitals in this study serves (University Malaya Medical Centre and Kuala Lumpur Hospital) has a combined population of 5.3 millions. There were 0.7 million (13.8%) ethnic Indians. The prevalence of epilepsy is estimated at 0.5% of the general population. As no case of hot water epilepsy was found in the 189 patients surveyed, the prevalence of hot water epilepsy among Indians in Kuala Lumpur and Selangor is 0-1.93% (95% C.I.).

A family history of hot water epilepsy has been reported in 7-15% of Indian probands.<sup>2,4</sup> Hot water epilepsy was familial in 18% of cases in an epidemiological study conducted in rural Bangalore, South India. This included one family with all the 7 members having hot water epilepsy.<sup>5</sup> The traditionally high incidence of consanguineous marriage in many South Indian families is speculated to the increase in appearance of hot water epilepsy in these population.<sup>6</sup> Ethnic Indians in Malaysia are largely of South Indian descents. Consanguineous marriage is common among Malaysian Indians as for Indians in South India. When systemically surveyed, none of the Malaysian Indian epilepsy patients had hot water epilepsy. No case of hot water epilepsy has been previously reported anywhere in Malaysia. This study suggests that factors other than genetics may be important in the pathogenesis of hot water epilepsy.

None of the Malaysian Indian patient had the concept that hot water bath can precipitate seizures. On the other hand, "heatiness" as a cause of illness, including seizures, is common among all the three major races in Malaysia (Malays, Chinese, Indians).<sup>13</sup> Seven percent of the person with epilepsy in this study attributed their seizure precipitants to "heatiness". This

shows that the cultural concept of illness is important in the attributed precipitants of seizures. The absence of the concept of hot water epilepsy in the Malaysian Indian population may be an important factor in the seizure among the Malaysian Indian population.

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## REFERENCES

1. Mani KS, Gopalakrishnan PN, Vyas JN, Pillai MS. Hot-water epilepsy – a peculiar type of reflex epilepsy, a preliminary report. *Neurology (India)* 1968;16:107-10
2. Mani KS, Mani AJ, Ramesh CK. Hot-water epilepsy, a peculiar type of reflex epilepsy. Clinical and electroencephalographic features in 108 cases. *Trans Am Neurol Assoc* 1975;99:224-6
3. Subrahmanayam HS. Hot water epilepsy. *Neurology (India)* 1972;20 (Suppl II): 247-51
4. Satishchandra P, Shivanakrishna A, Kaliaperumal VG, et al. Hot water epilepsy: A variant of reflex epilepsy in Southern India. *Epilepsia* 1988;29:52-6.
5. Gururaj G, Satishchandra P. Correlates of hot water epilepsy in rural South India: A descriptive study. *Neuroepidemiology* 1992;11:173-9
6. Satishchandra P, Ulla GR, Sinha A, Shankar SK. Pathophysiology and genetic of hot-water epilepsy. In: Berkovic SF, Genton P, Hirsch E, Picard F, eds: *Genetics of focal Epilepsies: clinical aspects and molecular biology*. London: John Libbey, 1999;169-76.
7. Bebek N, Gurses C, Gokyigit A, Baykan B, Ozkara C, Dervent A: Hot water epilepsy: Clinical and electrophysiologic findings based on 21 cases. *Epilepsia* 2001;42;1180-4
8. Morimoto T, Hayakawa T, Sugie H, Awaya Y, Fukuyama T. Epileptic seizures precipitated by constant light, movement in daily life and hot water immersion. *Epilepsia* 1985;26:237-42
9. Stensman R, Ursing B. Epilepsy precipitated by hot water immersion. *Neurology* 1971;21:559-62
10. Szymonowicz W, Meloff KL. Hot water epilepsy. *Can J Neurol Sci* 1978;5:247-51
11. Ullal GR, Satishchandra P, Shanker SK. Hyperthermic Seizure: An animal model for Hot Water Epilepsy. *Seizure* 1996;5:221-8.
12. Klauenberg BJ, Sparber SB. A kindling like effect induced by repeated exposure to heated water in rats. *Epilepsia* 1984;25:292-301
13. Diong KI. Folk medical beliefs and practices in Sitiawan. *Med J Malaysia* 1977;31:338-46