

Short Communication

High Prevalence of Human Cysticercosis in a Rural Village in Western India

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INTRODUCTION

Cysticercosis is a major public health problem in several Asian countries that affects several million people by causing neurological morbidity and imposing economic hardship on impoverished populations [1]. Neurocysticercosis, a severe form of cysticercosis, is an emergent condition in several countries. Experts in these countries are now realizing the full implications of this problem and the need for timely action.

The present study explores the problem of cysticercosis in a village in the Western Indian state of Goa. A Portuguese colony until 1961, this state enjoys a unique westernized culture. In contrast to other states in India, pig rearing is fairly common in rural areas. The present study seeks to assist policy makers in designing appropriate strategies to control this largely hidden problem and to contribute to global knowledge on the subject.

MATERIALS AND METHODS

The study was conducted in Agassaim, Goa, India, a village with a population of around 5,400. A majority of the population (66%) belonged to the middle income group. The village was 77% Catholic, 22% Hindu and 1% Muslim. A total of 450 individuals selected by age-stratified random sampling were subjected to a pre-tested structured questionnaire, and blood samples were taken for an ELISA test (Enzyme Immunoassay Melotest, Melotec Biotechnology, Spain) to diagnose cysticercosis. According to the manufacturer, Enzyme Immunoassay Melotest uses porcine vesicular cyst antigen and has a sensitivity and specificity of 95.6% and 97% respectively. Stool examination was done for proglottids and *Taenia* species eggs. SPSS 14.0 was used for the statistical analysis. The Ethics Committee of the Institute approved the study, and informed written consent was obtained from study participants.

OBSERVATIONS

Of the total 450 individuals, 101 tested sero-positive (sero-prevalence 22.4%). The sero-prevalence increased with age and peaked at around 65 years of age (Table 1). Also, a high sero-prevalence (19.2%) was found in children less than five years of age.

Table - 1: Age-related sero-prevalence of cysticercosis

Age group (years)	Total Number tested	Number of sero-positives	Prevalence (%), (95% CI)
0-4	26	5	19.2, (4.1-36.6)
5-14	97	18	18.6, (10.8-32.9)
15-24	90	15	16.7, (9.0-31.1)
25-34	75	19	25.3, (15.5-41.6)
35-44	68	17	25.0, (14.7-41.8)
45-54	41	10	24.4, (11.2-44.0)
55-64	29	9	31.0, (14.2-53.8)
65+	24	8	33.3, (14.5-57.7)
Total	450	101	22.4, (18.6-30.0)

Chi-square for trend = 4.87; p=0.02

Prevalence of taeniasis by stool examination was 9.7% (42/433) with 95% CI: 6.9%-12.5%. Individuals with taeniasis were three times more likely to have cysticercosis [OR =3.62; 95% CI = 1.76-7.45]. No statistical association could be established between pork consumption and seropositivity (P=0.10) or between religion and seropositivity (P=0.26), even though Hindus and Muslims are considered to be strict non-pork consumers traditionally and by religion. About 44.9% (53/118) of the households were engaged in pig rearing. The seropositivity rate for cysticercosis in households engaged in such pig rearing was 52.8% as opposed to 52.3% in non-pig rearing households. 22.8% of the sero-positives were found to be symptomatic (seizures, frequent headaches and behavioral disturbances). Among those with seizure disorders, 35.7% were found to be seropositive (OR=1.97, 95% CI: 0.55-6.7) while 52.4% of those with frequent headaches were found to be seropositive (OR

=4.14, 95% CI: 1.56-11.03).

DISCUSSION

The sero-prevalence of cysticercosis was 22.4% in Goa, one of the highest levels worldwide. Carrique-Mas J et al reported a sero-prevalence of 22% in Bolivia [2] which also increased by age. Taeniasis and cysticercosis were also strongly associated. The finding closely follows that of Nguekam JP et al [3]. Like the Jewish Community in New York (strict non-pork consumers) studied by Schantz PM et al [4], no association between pork consumption and seropositivity or between religion and sero-positivity was found in our study. This paradoxical finding indicates generalized exposure to *Taenia solium* eggs through contaminated vegetables or fruits grown and consumed in the study area. Healthy food habits and sanitary improvements are imperative to effectively control this public health problem. There is an urgent need therefore, to institute an effective health

education campaign aimed at preventing both *Taenia solium* infection and cysticercosis in the community.

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