

## SEROPREVALENCE OF SELECTED VIRAL, BACTERIAL AND PARASITIC INFECTIONS AMONG INPATIENTS OF A PUBLIC PSYCHIATRIC HOSPITAL OF MEXICO

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### SUMMARY

We sought to determine the frequency of serological markers of selected infections in a population of psychiatric patients in Durango City, Mexico, and to determine whether there are any epidemiological characteristics of the subjects associated with the infections. One hundred and five inpatients of a public psychiatric hospital of Durango were examined for HBsAg, anti-HCV antibodies, anti-HIV antibodies, anti-*Brucella* antibodies, rapid plasma reagin and anti-*Cysticercus* antibodies by commercially available assays. Anti-*Cysticercus* antibodies were confirmed by Western blot and HBsAg by neutralization assay. Epidemiological data from each participant were also obtained. Seroprevalences of HBsAg, anti-HCV, anti-HIV, anti-*Brucella*, rapid plasma reagin and anti-*Cysticercus* antibodies found were 0.0%, 4.8%, 0.9%, 0.0%, 1.9%, and 0.9%, respectively. Overall, 9 (8.6%) inpatients showed seropositivity to any infection marker. We concluded that our psychiatric inpatients have serological evidence of a number of infections. HCV is an important pathogen among our psychiatric inpatients. Health care strategies for prevention and control of infections in Mexican psychiatric patients should be considered.

**KEYWORDS:** Psychiatric patients; Infections; Prevalence; Virus; Parasite; Bacteria.

### INTRODUCTION

Psychiatric patients have been found to suffer from a number of infections in a higher frequency than other populations, and the prevalence of infections in psychiatric patients may vary substantially among countries. Prevalence studies indicate that psychiatric patients have a significantly higher frequency of anti-*Cysticercus* antibodies than those observed in the general population or healthy control subjects. In a Venezuelan study, 18.4% of the psychiatric inpatients studied were positive in the blood test for cysticercosis as compared to only 1.6% prevalence in the control group<sup>7</sup>. Similarly, a study carried out in Brazil showed that 5% of the patients admitted to a psychiatric hospital were positive for anti-*Cysticercus* antibodies while only 2.3% prevalence was found in adults of the general population group<sup>12</sup>. Reports also indicate that patients with mental illnesses have a high prevalence of human immunodeficiency virus (HIV), hepatitis B virus (HBV), and hepatitis C virus (HCV) infections. In an American study, researchers found that the prevalence of HIV in individuals with severe mental illness was approximately eight times the estimated US population rate, and prevalence rates of HBV and HCV were approximately five and 11 times the overall estimated population rates for these infections, respectively<sup>10</sup>. In an

Indian study, newly registered adult psychiatric outpatients at a general hospital showed significantly higher seroprevalence of HIV infection than healthy blood donors (1.03% versus 0.5%, respectively)<sup>11</sup>. For its part, patients with *Brucella* infection may manifest central nervous system involvement, and neurobrucellosis should be considered in patients with unexplained psychiatric and neurological symptoms<sup>6,13</sup>. *Treponema pallidum* infections should be also borne in mind as a differential diagnosis in a number of neurological and psychiatric illnesses<sup>3</sup>. The epidemiology of infections in psychiatric patients in Mexico has been poorly explored. Therefore, we conducted a cross-sectional survey in order to determine the frequency of selected infections in a population of inpatients of a psychiatric hospital of Durango City, Mexico. In addition, we sought to determine whether any epidemiological characteristics of the patients correlated with the infections.

### MATERIALS AND METHODS

**Study population:** One hundred and five inpatients of a public psychiatric hospital (Hospital de Salud Mental, Dr. Miguel Vallebuena) in Durango City, Mexico were studied. This hospital attends psychiatric patients of both urban and rural areas of Durango State, however, the

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great majority of patients attended comes from urban areas. In addition, most inpatients are homeless and less than 1% has a history of incarceration. All subjects were screened from December 2005 to March 2006. This study was evaluated and accepted by the Institutional Ethical Committee. A written informed consent was obtained from all participants of the study.

**Serology for anti-*Taenia solium* antibodies:** Serum samples from the psychiatric patients were analyzed for anti-*Taenia solium* antibodies by an Enzyme Linked Immunosorbent Assay: Cysticercosis (*Taenia solium*) (Diagnostic Automation, Inc. Calabasas, CA, USA). Confirmation of serum anti-*Cysticercus* antibodies was performed by Western blot as described elsewhere<sup>7</sup>.

**Serology for viral infection markers:** HBV surface antigen (HBsAg), anti-HCV and anti-HIV antibodies were determined in patients by means of the Microparticle Enzyme Immunoassays HBsAg (V2), HCV version 3.0, and HIV 1 / 2 gO, respectively. All these kits were manufactured by Abbott Diagnostics (Wiesbaden, Germany), and were run in the Abbott AXSYM system (Abbott Laboratories, Chicago, USA).

**Serology for brucellosis and syphilis:** Anti-*Brucella* antibodies and rapid plasma reagin were detected in patients by the Rose Bengal plate agglutination test (Laboratorios MICSA, FD, Mexico) and by rapid plasma reagin (RPR) test (Laboratorios Licon, S.A, Tlalnepantla, Mexico), respectively.

**Epidemiological data:** Socio-demographic data including age, gender, and socio-economic level were obtained from all patients. Clinical data including psychiatric diagnosis, history of drug use, transplantation, haemodialysis, piercing, blood transfusion, sexual promiscuity, sexual practices, and surgery from the patients were also obtained. In addition, behavioural data including animal contacts, foreign travel, unpasteurized milk or milk products consumption, untreated water consumption, unwashed raw vegetables or fruits consumption, contact with soil (gardening or agriculture), and eating outside of the home from the patients studied were obtained. In the psychiatric patients, data was obtained from the patients, medical examination records, and informants. Classification of mental illnesses was performed according to the ICD-10 criteria<sup>2</sup>.

**Statistical analysis:** Analysis of results was performed with the aid of the software Epi Info 6. For comparison of the frequencies among the groups, the Fisher exact test was used. A *p* value of less than 0.05 was considered significant.

## RESULTS

**Epidemiological data:** Of the 105 psychiatric patients studied, 35 were women and 70 were men. The mean age was 46.5 years (range: 18 to 83 years). Patients suffered from a number of mental illnesses including schizophrenia (F20, *n* = 27), mental and behavioral disorders due to psychoactive substance use (F19, *n* = 25), mental retardation (F71-73, *n* = 18), mental disorder (F06.8, *n* = 16), mental and behavioral disorders due to use of alcohol (F10, *n* = 7), bipolar affective disorder (F31, *n* = 5), dementia of the Alzheimer type (F00, *n* = 2), epilepsy (G40, *n* = 2), severe depression episode (F32.2-3, *n* = 2), and vascular

dementia (F01, *n* = 1). History of intravenous drug use, piercing, and blood transfusion were found in one (0.9%), 12 (11.4%), and three (2.9%) patients, respectively. While history of surgery, sexual promiscuity, and homosexuality were found in 35 (33.3%), 16 (15.2%), and one (0.9%) patients, respectively. History of transplantation and hemodialysis was not present in any patient.

**Serology for anti-*Taenia solium* antibodies:** Out of the 105 patients studied, eight (7.6%) were positive for anti-*Taenia solium* antibodies by the enzyme immunoassay. All positive samples for anti-*Taenia solium* antibodies were further analyzed by Western blot and only one sample was confirmed positive, therefore the prevalence of anti-*Taenia solium* antibodies was 0.9%.

**Serology for HBsAg, anti-HCV and anti-HIV antibodies:** None of the patients was positive for HBsAg. Out of the 105 patients studied, five (4.8%) were positive for anti-HCV antibodies, and one (0.9%) was positive for anti-HIV antibodies.

**Serology for anti-*Brucella* antibodies and RPR:** Anti-*Brucella* antibodies were not present in any patient. Out of the 105 patients studied, two (1.9%) were positive for RPR.

## DISCUSSION

In this study, we found that our psychiatric inpatients have a serological evidence of a number of infections in general, and a high prevalence of anti-HCV antibodies in particular. The 4.8% prevalence of anti-HCV antibodies found in our psychiatric population was much higher than those reported in studies of Mexican blood donors. For instance, CARRETO-VELEZ *et al.*<sup>1</sup> and LADRÓN DE GUEVARA *et al.*<sup>5</sup> found 1.1% and 0.8% seroprevalence of anti-HCV antibodies in large groups of Mexican blood donors, respectively. The prevalence of anti-HCV found in our psychiatric patients is also higher than that observed in blood donors in local public blood banks (less than 0.5%, unpublished data). Similarly, although in less extent than HCV, our 0.9% prevalence of anti-HIV antibodies in psychiatric patients seems to be higher than those found in Mexican blood donors. We found an anti-HIV antibodies case in about 100 patients, while an anti-HIV antibodies case in about 400 Mexican blood donors has been reported<sup>5</sup>. Our results on the prevalence of anti-HCV and anti-HIV antibodies in psychiatric patients are comparable with those reported in a Spanish study where researchers found a seroprevalence of HCV and HIV infections in psychiatric patients of 5.1% and 1.4%, respectively<sup>4</sup>. In contrast, our frequencies of HCV and HIV infections in psychiatric patients are lower than those reported in an American study where researchers found HCV and HIV infections in 14.4% and 3.0% of patients with severe mental illness, respectively<sup>9</sup>.

With respect to bacterial infection markers, we found two (1.9%) patients positive for RPR. Although the frequency of RPR seropositivity found in psychiatric patients was low, results suggest that psychiatric patients may have a higher frequency of RPR seropositivity than healthy populations of Mexico. For instance, in a large group of Mexican blood donors, PITA-RAMIREZ *et al.*<sup>8</sup> found a proportion of one positive RPR case in about 840 blood donors, while we found a proportion of

one case in about 50 psychiatric patients. In addition, the frequency of positive RPR cases among blood donors of our community is much lower (less than 0.1%, unpublished data) than the one found in our psychiatric patients.

Concerning the prevalence of anti-*Cysticercus* antibodies in our psychiatric patients, we found only one positive case. Results suggest that cysticercosis seems not to represent a major health problem in our psychiatric population. Nevertheless, our prevalence is lower than that reported in a Brazilian study where researchers found a 5.0% prevalence of anti-*Cysticercus* antibodies in patients of a psychiatric hospital<sup>12</sup>. Similarly, in a Venezuelan study, chronic psychiatric inpatients showed a prevalence of 18.4% of anti-*Cysticercus* antibodies<sup>7</sup>.

We were unable to obtain any association between infections and the sociodemographic, clinical, and behavioral characteristics of the infected individuals. The low number of patients with positive infection markers found in this study reduces the statistical power to find associations between seropositivity and the epidemiological characteristics in psychiatric patients. Certainly by increasing the sample size the statistical power increases and some risk factors might turn out to become significant. This is especially interesting for risk factors as substance abuse and blood transfusion. However, based on the usual route of transmission of the infections found in this study, it is possible that parenteral or sexual routes of infections are important for infection acquisition in psychiatric patients.

General characteristics in patients and facilities in the psychiatric hospital explored are similar to those found in the majority of public psychiatric hospitals of Mexico. Results of this study may reflect, although in a limited extent, the frequencies of the selected infections in psychiatric patients of Mexico. However, further studies should be conducted in order to determine the national magnitude of infections as a public health problem in psychiatric patients of Mexico.

## CONCLUSIONS

We conclude that our psychiatric inpatients have serological evidence of a number of infections. HCV is an important pathogen among our psychiatric patients. Health care strategies for prevention and control of infections in Mexican psychiatric patients should be considered.

## RESUMO

### Seroprevalência de infecções virais bacterianas e parasíticas nos pacientes internados em hospital público psiquiátrico do México

Procuramos determinar a frequência de marcadores sorológicos de infecções em pacientes psiquiátricos da cidade de Durango, México e determinar se existem características epidemiológicas dos pacientes que podem ser associados a estas infecções. Cento e cinco pacientes internados neste hospital psiquiátrico de Durango foram examinados para HbsAg, anticorpos anti-HCV, anticorpos anti-HIV, anticorpos anti-*Brucella*, reagentes plasmáticos imediatos e anticorpos anti-*Cysticercus* por testes comerciais. Os anticorpos anti-*Cysticercus* foram confirmados por Western Blot e o HbsAg por testes de neutralização. Dados epidemiológicos de cada participante foram também obtidos.

Seroprevalências encontradas de HbsAg, anti-HCV, anti-HIV, anti-*Brucella*, reagente plasmático imediato e anticorpos anti-*Cysticercus* foram respectivamente 0,0%, 4,8%, 0,9%, 0,0%, 1,9% e 0,9%. No conjunto, 9 (8,6%) de pacientes internados mostraram soropositividade para marcador infeccioso. Concluímos que nossos pacientes psiquiátricos internados têm evidência sorológica de infecções. HCV é um patógeno importante entre os pacientes psiquiátricos internados. Estratégias de saúde pública para prevenção e controle de infecções em pacientes psiquiátricos do México devem ser consideradas.

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