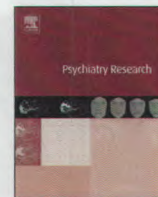




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Biometric parameters of the hand as an index of schizophrenia—A preliminary study[☆]

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ABSTRACT

Since abnormalities in distal upper limb development are among the minor physical anomalies associated with schizophrenia we attempted to determine whether patients with schizophrenia can be identified on the basis of specific morphologic and dermatoglyphic features of the hand. Photographs and prints of the hands of 38 patients with schizophrenia and those of 42 control subjects were evaluated and graded on 13 biometric parameters. Results were statistically evaluated. A combination of three of the parameters was found to have good predicting abilities to distinguish between schizophrenics and controls. Subjects having high values in these three parameters were found to have a higher propensity to be defined as schizophrenics. In order to define a simple rule for classifying subjects we chose a criterion of having a value of 3 (in a scale from 1 to 3) in at least one of these three discriminating variables. This rule yielded an overall accuracy of 81.2%. Among controls, 85.7% of subjects did not fulfill such criteria, while 14.3% were defined as false positives. Among schizophrenics 76.3% achieved this condition while 23.7% were false negatives. The technique's objectivity and ease of application could facilitate the diagnosis of this disease.

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1. Introduction

The association of morphologic and dermatoglyphic features of the distal upper limb with mental health disorders has been the subject of numerous publications (e.g. Reed and Opitz, 1981; Jelovac et al., 1998; Manning et al., 1998; Kimura and Clarke, 2001). Since the embryonic development of the central nervous system coincides with that of the distal upper limbs, in the late first and early second trimesters of pregnancy and both from the ectoderm of the fertilized ovum, associated abnormalities might be expected (O'Callaghan et al., 1995; Fatjo-Vilas et al., 2008).

It has been suggested that schizophrenia is determined by genetic factors along with intrauterine disturbances in the neurodevelopment of the brain's cortex in the embryonic stage (Kallmann, 1938; Murray and Lewis, 1987; Marenco and Weinberger, 2000; Compton and Walker, 2009). The association

of schizophrenia with anomalies of the distal upper limb as a result of an intrauterine insult has also been described (e.g. Bracha et al., 1991, 1992; Green et al., 1994; Davis and Bracha, 1996; Bramon et al., 2005; Weinberg et al., 2007; Fatjo-Vilas et al., 2008; Xu et al., 2011).

The purpose of this preliminary study is to determine whether patients with schizophrenia can be distinguished from normal control subjects on the basis of specific dermatoglyphic and morphologic features of their hands.

2. Methods

2.1. Subjects

Eighty subjects were recruited to participate in the study, 38 ambulatory patients with schizophrenia treated at a government psychiatric hospital in central Israel and 42 controls all free of recognizable mental health problems, selected randomly from hospital staff and volunteers. The diagnosis of schizophrenia was made in accord with DSM IV criteria, with the condition further defined in sub-categories. Each patient had earlier been apprised of the details of this study and each subsequently signed a form of consent to participate.

Patients were examined in accord with the Helsinki committee at the hospital with medical circumstances of each patient provided by the day-patient hospital.

Both groups were similar in their age distribution; control group age ranged between 21 and 67 years (mean=41.5, S.D.=11.6), while schizophrenia group age

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