

# SLEEP IN SCHIZOPHRENIA: A PRELIMINARY STUDY USING THE PITTSBURGH SLEEP QUALITY INDEX

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*Accepted in revised form 14 June 2002; received 22 April 2002.*

## Summary

Schizophrenia is related to changes in the architecture of sleep evaluated with polysomnography. Our purpose is to evaluate the sleep quality of schizophrenic people, comparing a schizophrenic group with a control group, and to investigate the effect of these factors. Material and methods: We evaluated 44 patients, 32 men and 12 women, comparing them with 44 healthy people. Both groups were questioned using the Spanish version of the Pittsburgh Sleep Quality Index (PSQI). Results: Sleep quality in schizophrenics is damaged; they spend more time in bed than controls of the same age do and they sleep longer. These factors could represent an attempt to compensate for the deficit in slow wave sleep. Conclusion: Sleep quality in schizophrenic people is damaged. Thus, sleep quality profile could be a risk marker for this illness.

**Key Words:** Pittsburgh Sleep Quality Index, Schizophrenia, Sleep Quality.

## Introduction

Some research has shown that schizophrenia is related to changes in the architecture of sleep evaluated with polysomnography. Specifically, lack of slow wave sleep (SWS) has been described, as well as changes in the amount of rapid eye movement (REM) sleep and a decrease in REM latency (Keshavan et al. 1995, 1996; Kato et al. 1999; Hoffmann et al. 2000).

At a structural level, SWS changes have been related to lateral ventricle dilation, establishing a relationship with constant alterations, especially with those effecting cortico-thalamic neuronal nets. However, at the clinic level SWS changes seem to have some connection with cognitive deterioration, with a worse long-term prognosis and with generally negative symptoms (Orzack et al. 1977; Ganguli et al. 1987; Van Kammen et al. 1988; Keshavan et al. 1995, 1996; Hoffmann et al. 2000).

Our purpose has been to evaluate the sleep quality of schizophrenic people, comparing a schizophrenic group with a control group, and to investigate the effect of these factors.

## Methods

Forty-four schizophrenic patients, 32 men and 12 woman, were evaluated. They were chosen at random from among those seen in the Department of Psychiatry of the University Hospital of Valladolid (27, 61.4%) and in the consulting room of the Mental Health Center District II of Soria (17, 38.6%), both in Spain. Average age was  $35.02 \pm 11.27$  (range 19-72), with no important differences between age, sex or area studied.

Twenty-four people had been diagnosed as Paranoid Schizophrenia, another 15 people as Hebephrenic Schizophrenia and 1 person as Undifferentiated Schizophrenia. With respect to illness development, 26 patients were considered Episodic with interepisode residual symptoms and 12 continuous; 5 cases had other development types. There was a patient not classified as to schizophrenia type. DSM-IV (American Psychiatric Association 1995) criteria were used in the diagnosis. No patient was interviewed during an acute crisis.

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Thirty-six patients took oral antipsychotics, and 17 patients received depot antipsychotics periodically. Eleven were under treatment with oral antipsychotics and depot neuroleptics simultaneously; in addition, 23 patients took benzodiazepines. In the last daily dose (taken after six p.m.), 16 patients took benzodiazepines and neuroleptics, 5 patients took only benzodiazepines, 13 only neuroleptics, 3 other kinds of drugs and 7 people took no medication after 6 p.m.

The control group consisted of a sample of 44 healthy people who were paired with the patients by sex and age. They came from a sample of healthy people used as the control in a previous investigation (Royuela 1996).

Both groups were questioned using the Spanish version of the Pittsburgh Sleep Quality Index (PSQI) (Buysse et al. 1989; Macias and Royuela 1996). Dr. Buysse and his collaborators from the Psychiatric Department at Pittsburgh University designed the PSQI to determine sleep quality in the month prior to doing the test.

The PSQI produces seven marks that provide information about components of subjective sleep quality: Subjective Sleep Quality, Sleep Latency (the time the patients take to get to sleep), Sleep Duration, Sleep Efficiency (the percentage of time patients think they are sleeping during the total time lying in bed), Sleep Perturbation (the frequency of alterations such as coughs, snores, being hot or cold, or needing to get up to go to the toilet), Use of hypnotics and Daily Disfunction (how easy it is to fall asleep while performing some daytime activity, as well as the tiredness the patients suffer from). Each of these components is marked from 0 to 3: 0 indicates there are no problems in this area and 3 means there are serious problems in this area. The sum of the points in each component generates a total score ranging from 0 to 21. We considered 5 as the cut-off point: 5 points or less indicated good sleepers, while more than 5 points would mean bad sleep quality. With this cut-off point, the Spanish version of the PSQI achieved sensitivity of 88.63%, specificity of 74.19% and efficiency of 80.66% (Royuela 1996). Graphs showing the marks for each component allow us to obtain "profiles," giving us a clearer idea about where the specific problems lie for every patient. These profiles have also been shown in epidemic studies to be different for each type of sleep pathology (Buysse et al. 1989).

The non-parametric Wilcoxon test was used for statistical analysis, and point comparison and the Chi-square test were used for the comparison of proportions.

## Results

The schizophrenic patient's average total score was  $6.63 \pm 3.79$ , while the total control score was  $4.52 \pm 3.39$ , the difference being statistically significant ( $T=238$ ,  $z=2.66$ ,  $p < 0.01$ ). Partial component analysis showed significant differences in C2 (Sleep Latency;  $1.43 \pm 1.08$  in schizophrenics against  $0.86 \pm 0.85$  in the control group;  $T=144$ ;  $z= 2.43$ ,  $p < 0.05$ ), C3 (Sleep Duration;  $0.22 \pm 0.71$  in schizophrenics,  $0.88 \pm 0.96$  in the controls;  $T=79,5$ ;  $z=2.98$ ,  $p < 0.005$ ), C6 (Hypnotic Drug Use,  $1.29 \pm 1.47$  in schizophrenics,  $0.15 \pm 0.52$  in the controls;  $T=6$ ;  $z=3.80$   $p < 0.0005$ ) and C7 (Repercussion on Wake State,  $1.04 \pm 0.88$  in schizophrenics against  $0.63 \pm 0.74$  in the controls;  $T=98.57$   $z=2.17$ ,  $p < 0.05$ ). Differences were not significant in C5 (Sleep Disturbances) ( $1.11 \pm 0.38$  in schizophrenics and  $0.95 \pm 0.48$  in the controls;  $T=21$ ,  $z=1.71$ ,  $p < 0.1$ ).

In the evaluation based on the PSQI, 23 schizophrenics out of the total of 44 had a score greater than 5 (indicating "poor sleep quality"). In the control group, 10 people had over 5 points. Chi-square test showed that these proportions were statistically significant ( $p < 0.005$ ).

Age, sex, personal situation, area where this study was carried out, and the different drugs the patients took (oral neuroleptics, depot neuroleptics, benzodiazepines, and medication taken after 6 p.m.) did not appear to be significant in the covariance analysis.

## Discussion

Bearing in mind the normal group results, it seems the patients suffer from an increase of total sleep time, they spend more time in bed, sleep latency is altered, the patients get up later and they also take a lot of hypnotic drugs. This is very clear if we look at the profile produced by PSQI, in which important differences in Sleep Latency, Sleep Duration, Hypnotic Drugs Use, and Daytime Disfunction can be seen. This is also corroborated by the total score. Based on these results, it seems that schizophrenics do not have the perception of good sleep quality.

There could be a relationship between all these findings and the SWS decrease observed in schizophrenic patients. This seems to be stable over time, and not related to any acute crisis (Keshavan et al. 1996).

In contrast, another point of view would relate the negative symptoms to sleep quality deterioration, because it is known that going without sleep leads to bad moods, bad performance and lack of desire to communicate. This means that negative symptoms would be, in part, the reflection of the patients' sleep quality deterioration.

As a conclusion of this study we can say that sleep quality in schizophrenic people is damaged, they spend more time in bed than controls of the same age and they sleep longer. These last two facts could be an attempt to compensate for the deficit in SWS, but the effect of antipsychotics must be clarified adequately. If our findings are corroborated, the PSQI could be an instrument in schizophrenia research, because sleep quality profile could be a risk marker for this illness.

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