Nightmare frequency in schizophrenic patients, healthy relatives of schizophrenic patients, patients at high risk states for psychosis, and healthy controls

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Summary. Schizophrenia is often accompanied by sleep problems, but dreaming seems to be altered as well. The present study investigated nightmare frequency and its correlates in patients with schizophrenia, patients in at risk mental states for psychosis (ARMS), first-grade relatives of schizophrenic patients, and healthy controls. Patients with schizophrenia experienced significantly more nightmares compared to healthy controls. Moreover, nightmare frequency was found to be linked to patients' subjective distress. ARMS patients also showed heightened nightmare frequency whereas nightmare frequencies of first-grade relatives were comparable to the values of healthy controls. As nightmare frequency was not related to the severity of positive symptoms or present in subjects at increased genetic risk, they seem to reflect the waking-life distress associated with the disorder and its prodrome. Longitudinal studies should be carried out to take a closer look at the interaction between stress and nightmares.

Keywords: Nightmares, schizophrenia, high risk states for psychosis

1. Introduction

There have been studies investigating sleep in patients with schizophrenia (for a review see: Chouinard, Poulin, Stip, & Godbout, 2004; Godbout, 2010). According to the DSM-5 the symptomatology of this disorder is composed of positive symptoms like hallucinations, delusions, disorganized speech, disorganized behavior or catatonic behavior as well as negative symptoms including alogia, flattened emotions and avolition. In addition, schizophrenia is often accompanied by sleep problems or actual sleep disorders have been studied by a diverse number of researchers (Godbout, 2010; Manoach & Stickgold, 2009; Monti & Monti, 2005; Schredl & Engelhardt, 2001). It has been found that these sleep characteristics seem to be an intrinsic feature of schizophrenia (Benson, 2008; Manoach & Stickgold, 2009). In his review, Godbout (2010) summarized the findings as follows: increased sleep latency in patients with schizophrenia as well as decreased total sleep time, and decreased slow-wave sleep (SWS: stage 3 and stage 4) compared to controls. Furthermore, a prolonged wake time after sleep onset as well as a greater amount of nocturnal awakenings could be found in patients with schizophrenia (Godbout, 2010; Schredl & Engelhardt, 2001). Additionally, a deficit of sleep spindles was detected in medicated patients (Manoach et al., 2010; Seeck-Hirschner et al., 2010; Wamsley et al., 2012) but not in drug-naïve patients (Poulin, Daoust, Forest, Stip, & Godbout, 2003). Sleep spindles seem to play an important role in the consolidation of memories not only in healthy controls (e.g., Fogel & Smith, 2006) but also in patients with schizophrenia (Ferrarelli & Tononi, 2011).

Indeed, not only sleep but also dreaming seems to be of a different kind in schizophrenic patients. Kramer (2010) reported in his review that the dream content of schizophrenic patients is less complex, more direct and that characters in their dreams are mostly strangers, males and groups of characters. Furthermore, dream reports include more anxious, sexual, and hostile content. Dreams are generally more negatively toned than dreams of healthy controls or other patient groups. Even though Kramer (2010) summarizes that dreams of patients with schizophrenia show higher level of bizarreness and implausibility (reflecting their thought disorder during waking life), the findings are conflicting with some studies showing less bizarre dreams (Carrington, 1972; Dement, 1955), more bizarre dreams (Noreika, 2011), or no differences in treated patients (Lusignan et al., 2009; Scarone et al., 2008). As Schredl and Engelhardt (2001) found a direct correlation between positive symptoms (paranoid ideation, psychoticism) and dream bizarreness, these conflicting results might be explained by differing severity of samples' waking-life symptomatology. Furthermore, the waking lives (or more precisely the hallucinations) of schizophrenic patients have been compared to their dream contents and both seem to be related (Schredl, 2011) which is in accordance with the continuity hypothesis of dreaming which states that waking life experiences are reflected in dreams (Schredl, 2003a). However, patients are able to discriminate between their dreams and their hallucinations (Kramer & Roth, 1978). Two studies (Lusignan et al., 2009; Okorome Mume, 2009) found increased nightmare frequency in schizophrenic patients compared to controls.

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The present study investigated nightmare frequency and its correlates in patients with schizophrenia. According to the continuity hypothesis, the waking-life distress of schizophrenic patients is reflected in more negatively toned dreams and nightmares. It was thus expected that patients with schizophrenia have significantly more nightmares than healthy controls. Furthermore, the present study acted upon the assumption that waking-life distress is positively correlated with nightmare frequency in the patient group – as shown in healthy controls (Schredl, 2003b). In addition, nightmare frequencies in patients with at risk mental states for psychosis (ARMS) and first-grade relatives of schizophrenic patients were studied in an exploratory way.

2. Method

2.1. Participants

Overall, seventeen inpatients diagnosed with schizophrenia (9 males and 8 females) were included in the study. Their mean age was 32.88 ± 10.15 yrs. Medications are listed in Table 1. Furthermore, fourteen ARMS outpatients including 9 males and 5 females with a mean age of 23.29 ± 3.91 yrs. were assessed. All ARMS patients were drug-naïve except for three patients, receiving a treatment with antidepressants. Moreover, seventeen healthy relatives of patients (7 males and 10 females) with a mean age of 34.41 ± 13.11 yrs., as well as twenty nine healthy participants (18 males and 11 females) with a mean age of 27.69 ± 9.46 yrs. took part in the present study. The healthy controls were negative regarding a family history of schizophrenia. The seventeen schizophrenic patients were recruited during their inpa-

Table 1. Medication of the schizophrenic group.

Pat-No.	Medication	Dosage
KSS01	Olanzapine	20mg
KSS02	Olanzapine	20mg
KSS03	Risperidone depot injection	25mg within 14 days
KSS04	Quetiapine sustained-release	400mg
KSS05	Quetiapine	600mg
KSS06	Clozapine	200mg
KSS08	Risperidone depot injection	50mg within 14 days
KSS10	Quetiapine	1000mg
KSS11	Quetiapine	1000mg
KSS12	Clozapine	350mg
KSS14	Clozapine	100mg/d
KSS15	Quetiapine, lorazepam	800mg; 0,5mg
KSS16	Quetiapine	800mg
KSS17	Quetiapine, lorazepam	800mg; 0,5mg
KSS18	No medication	
KSS21	Quetiapine sustained-release	300 mg
KSS22	Olanzapine	20 mg

tient treatment at the Central Institute of Mental Health in Mannheim, the ARMS outpatients were asked to participate during the diagnostic procedures in our specialized outpatient department. All participants completed the nightmare frequency scale.

2.2. Questionnaire about dreaming

All participants were asked to subjectively rate their frequency of dream recall during the last couple of months on a 7-point rating scale (0 = never, 1 = less than once a month, 2 = about once a month, 3 = twice or three times a month, 4 = about once a week, 5 = several times a week, 6 = almost every morning) as well as their nightmare frequency on an 8-point scale (0 = never, 1 = less than once a year, 2 = about once a year, 3 = about two to four times a year, 4 = about once a month, 5 = twice or three times a month, 6 = about once a week, 7 = several times a week). Schredl (2004) found that the retest reliability of the 7-point rating scale for dream recall frequency was r=.83. Re-test reliability of the nightmare scale (testing for nightmare frequency) was r = .75 (p < .001) (Stumbrys, Erlacher, & Schredl, 2013).

2.3. Beck Depression Inventory (BDI)

For measuring personality, the German version of the NEO-To assess the participant's status of mood, all participants were requested to fill in the BDI (Hautzinger, Bailer, Worall, & Keller, 1994), a self-rating questionnaire composed of 21 items. The best fitting statement out of four answer options was to be chosen. The total score of the questionnaire was included in the analyses.

2.4. Positive and Negative Syndrome Scale (PANSS)

The PANSS (Kay, Fiszbein, & Opler, 1987) was conducted in the schizophrenic group. PANSS is an interview lasting about 30 to 45 minutes, including seven questions about positive symptoms (e.g., hallucinations, delusions - 7-point scale) seven questions about negative symptoms (e.g., flattening of affect, emotional pullback - 7-point scale), and sixteen global scale items, e.g. poor impulse control, active social avoidance, guilt feelings. The total PANSS score indicates the psychopathological severity status.

2.5. ERIraos (Early Recognition Inventory based on IRAOS)

The at risk mental states for psychosis (ARMS) has been assessed using the diagnostic rating scale ERIraos (Rausch et al., 2013), which provides a comprehensive assessment of basic symptoms, attenuated psychotic symptoms (APS), and brief, limited, intermittent psychotic symptoms (BLIPS) within one scale. During the interview a number of 50 symptoms predictive for a transition to psychosis are evaluated in a detailed way (score range: 0-200, cut-off = 30). In addition, several risk factors for psychotic disorders, such as birth complications or substance abuse, are described.

2.6. Erholungs-Belastungs Fragebogen (Recuperation/distress questionnaire) (EBF)

The EBF (Kallus, 1995) consists of 12 sub scales measuring the frequency of events that are potentially stressful and their subjectively noticed consequences, as well as restorative events and their consequences from the three previ-

Table 2. Means of dream recall frequency, nightmare frequency, BDI scores and distress scores; correlations between BDI and nightmare frequency as well as between distress and nightmare frequency.

Variable	Patients with schizophrenia	ARMS patients	First-grade Relatives	Healthy controls
Dream Recall Frequency	3.47 ± 2.03	4.07 ± 1.27*	3.06 ± 1.56	3.03 ± 1.50
Nightmare Frequency	3.65 ± 2.50*	3.79 ± 1.93*	2.41 ± 2.00	1.90 ± 1.92
BDI	11.13 ± 7.39*	21.36 ± 7.72*	6.18 ± 5.26	3.76 ± 4.11
Distress	1.57 ± 0.89*	2.44 ± 0.81*	1.31 ± 0.73	1.19 ± 0.56

Note. * Significant compared to controls (tests one-tailed for patients, two-tailed for the other two groups), $p < .05$

ous days. The EBF includes a total of 72 seven-point scaled items (6 items per subtest) with a coding from 0 = "never" to 6 = "incessantly" (e.g., "During the last 3 days and nights I was under time pressure"). For the total score of strain/distress the items of the first seven subtests "General Distress/dejection", "Strain", "social pressure", "unresolved conflicts", "fatigue/time pressure", "lack of energy/ lacking in concentration", "physical discomfort" are averaged.

2.7. Procedure

The study, which was approved by the local ethics committee, took place in the sleep laboratory of the Central Institute of Mental Health in Mannheim. Written consent was obtained from all participants. The sleep of all participants, the patient groups as well as the healthy groups, was investigated during three nights of sleep at the sleep laboratory. Preliminary to the first night, participants filled in different questionnaires (Nightmare frequency, Beck Depression Inventory (BDI) and the Erholungs-Belastungs Fragebogen (EBF)) and the schizophrenic group was interviewed (Positive And Negative Syndrome Scale (PANSS)). For the calculations only participants who answered the question about their subjectively rated nightmare frequency were included. The analysis of the sleep data will be presented elsewhere. The statistical analyses were carried out with SAS 9.2 for Windows software. As the nightmare frequency scale was ordinal, non-parametric statistics were carried out (Mann-Whitney-U-test, Spearman Rank correlations). For analyzing the questionnaire scores, t-tests were applied. As the hypotheses were directed, one-tailed tests were computed. Calculations of the correlations between BDI scores and nightmare frequency as well as distress and nightmare frequency have been carried out as one-tailed tests, since depressions and stress, independently of schizophrenia, are expected to have negative influences on nightmare frequencies. The significance level was $p = .05$.

3. Results

In the current study it was expected that nightmare frequency was higher for patients with schizophrenia. In Table 2 the means of dream recall frequency, nightmare frequencies, distress, and mean BDI scores are depicted. The statistical analysis concerning nightmare frequency revealed significantly higher frequencies for the patients with schizophrenia ($z = 2.2$, $p = .0145$; one-tailed) and ARMS patients ($z = 2.7$, $p = .003$; one-tailed) compared to healthy controls. In subsequent analysis the ARMS group has been split into drug-naïve patients ($N = 11$) and patients with medication ($N = 3$). The mean nightmare frequency of treated ARMS patients ($4.67 ± 0.58$) was higher but not significantly ($z = 1.4$, $p = .1749$) than the nightmare frequency of untreated ARMS patients ($3.55 ± 2.11$). When comparing the untreated group to healthy controls, significance level is reached ($z = 2.0$, $p = .049$). Dream recall frequency was found to be highest for ARMS patients followed by the schizophrenic group. The mean scores of relatives and healthy participants were similar. Results reached significance only with respect to the ARMS patients when compared to the healthy controls ($z = 2.1$, $p = .038$) which was not the case for schizophrenic patients ($z = 0.9$, $p = .374$) and relatives ($z = 0.2$, $p = .364$).

Taking a closer look at the BDI scores of the different groups, schizophrenic patients ($t = 3.7$, $p = .001$) as well as ARMS patients ($t = 8.0$, $p < .001$) scored significantly higher compared to the healthy controls, i.e. were more severely depressed. The relatives of schizophrenic patients showed higher scores compared to healthy controls (see Table 2), however, the difference was only marginally significant ($t = 1.7$, $p = .090$). Correlating BDI scores with nightmare frequency did not add up to significant results (see Table 3). With respect to PANSS and nightmare frequency, no significant correlation was found either (Table 4). The distress data which was expected to correlate with nightmare frequency was significantly higher for ARMS patients ($t = 5.9$, $p < .001$)

Table 3. Correlations between BDI scores, distress, and nightmare frequency for all four subsamples

Variable	Patients with schizophrenia	ARMS patients	First-grade Relatives	Healthy controls
Correlation BDI – Nightmare frequency	.388 (.100)	.189 (.258)	-.093 (.361)	.228 (.117)
Correlation distress – Nightmare frequency	.457 (.033)*	.070 (.406)	-.295 (.126)	-.023 (.454)

Note. P-values are one-tailed (Spearman Rank correlations), * $p < .05$

Table 4. Mean scores of PANSS (only schizophrenic group) and correlation between nightmare frequency and PANSS

PANSS scores	Mean score PANSS	Correlation nightmare frequency & PANSS r = (p-value)
Positive	15.06 ± 5.17	.017 (.949)
Negative	15.70 ± 4.06	.235 (.365)
General psychopathology	35.18 ± 8.93	.127 (.627)
Total score	65.94 ± 14.67	.174 (.504)

compared to healthy controls. The comparison between patients with schizophrenia and healthy controls also reached significance ($t = 1.9$, $p = .0298$; one-tailed). When correlating distress with nightmare frequency the results displayed a significant correlation only for the schizophrenic group (see Table 3). The mean of the ERIraos score was 47.21 ± 12.80. The correlation between the ERIraos score and nightmare frequency was not significant ($r = .043$, $p = .884$).

4. Discussion

The present study replicated the findings of previous investigations (Lusignan et al., 2009; Okorome Mume, 2009) that patients with schizophrenia experienced significantly more nightmares compared to healthy controls and linked nightmare frequency to patients' daytime distress. Moreover, ARMS patients also showed elevated nightmare frequencies. To the best of our knowledge, this is the first evaluation of nightmare frequency in ARMS patients.

However, the results must be qualified by some limitations. Sixteen of the seventeen participants in the patient group were under medical treatment. Consequently, dreams of schizrenic patients might not have been as affected by the illness as they would be without medication. It has been found that typical antipsychotic agents have positive effects on sleep disorders as well as effects on dreaming, especially in the form of dampening dream content (Lusignan et al., 2009). There are, however, no data available on how atypical neuroleptics like those analyzed in the present study affect dream content. The actual dream pattern might therefore be blurred. However, clinical experience indicates that antipsychotics do not have nightmares as a side-effect (Benkert & Hippius, 2011). Moreover, three of the ARMS patients that received medical treatment with antidepressants had more nightmares, a side-effect that is quite common to antidepressants (Benkert & Hippius, 2011).

The elevated nightmare frequency of those afflicted with schizophrenia has been found to be attended by distress, which is probably due to the disorder. The likely relation between distress and nightmares has also been mentioned in an article by Okorome Mume (2009). Additionally, it has been found that positive symptomatology, as well as negative symptoms, does not have a strong influence on the elevated nightmare rates. Thus patients' hallucinations or delusions do not act upon the negativity of their dreams. Nightmares therefore seem not to mirror symptoms specific to schizophrenia, but rather daytime distress accompanying this disorder. This relation is in line with the continuity

hypothesis (Schredl, 2003a) and confirms the formulated hypothesis of the present study.

When considering results of the relatives with respect to nightmare frequency, no differences compared to healthy controls could be found. This finding is another confirmation of the hypothesis that distress resulting from the disorder causes nightmares.

In this study, nightmare frequency of ARMS patients was studied in an explorative manner. The results for this group were comparable to results of the schizophrenic group. The ARMS patients receiving no medical treatment also exhibited higher nightmare frequencies when compared to controls, indicating that heightened nightmare frequencies in the schizophrenic group were not explained by medication effects. As the healthy controls were chosen to match the sample of schizophrenic patients, the age mean of the ARMS patients is somewhat lower (as expected) than for the controls. The age difference, however, is quite small and representative studies (Schredl, 2010, 2013) indicate that age has a negligible effect on nightmare frequency. The intensity of prodromal symptoms and the severity of depression symptoms were not correlated with nightmare frequency; one might speculate that nightmare frequency is related to waking-life distress; even though the correlation was non-significant in this small sample.

The results of the present study suggest that nightmare therapy as well as stress reduction for schizophrenic patients might be beneficial, since it was not the positive symptoms, but rather levels of distress that accompanyi the disorder, that seem to elevate nightmare frequency. For future research it would be interesting to find out more about the relation between distress and nightmare frequency. The present study did not inquire concerning the direction of causality between these two constructs. It is, thus, still unclear whether a heightened stress level results in more nightmares or if the causality is vice versa. This could be studied by means of a longitudinal study involving ARMS patients followed up to first episode of psychosis and/or in schizophrenic patients during the course of their illness. Here, waking-life distress and nightmare frequency should be assessed as a means for taking a closer look at the interaction between stress and nightmares. As nightmares in childhood predict psychotic symptoms at the age of 12 yrs. (Fisher et al., 2014) and frequent childhood nightmares were often find in case histories of schizophrenic patients (Hartmann, Russ, & Van der Kolk, 1979), it would be very interesting to carry out longitudinal studies with children suffering from frequent nightmares.

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