Sleep and adaptation disorders in military personnel with blast injury

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Sleep and adaptation disorders are common in traumatic brain injury (TBI) resulting from blast injuries (BIs) and can significantly complicate the recovery, leading to delayed neurocognitive, psychiatric and behavioural disorders.[1 2] Nevertheless, auditory disorders and tinnitus after repeated TBIs significantly worsen and affect daily activity through impaired sleep quality, irritability, anxiety and difficulties with concentration.[3–5] We conducted this study to analyse the characteristics of sleep and adaptation disorders in military personnel with BIs.

Data were collected from October 2023 to April 2024 among 35 military personnel with BIs aged between 22 and 56 years (mean=31, SD=33.9), undergoing treatment at the University Clinic, with the exclusion of patients who had sleep disorders before the injury and included only military personnel who had sustained a mild TBI and were in the acute phase of their recovery. Sleep quality was assessed using the modified Pittsburgh Sleep Quality Index (PSQI). A sleep quality score of 0–7 points was considered satisfactory, scoring above 7 points was categorised as having poor sleep quality. Adaptation disorders were identified using the Hospital Anxiety and Depression Scale (HADS). On the HADS, scores above 11 were considered significant and indicative of clinical manifestations of adaptation disorder. Participants were divided into three groups: group 1—BI with TBI, barotrauma and tinnitus (n=5, 14.3%); group 2—BI with TBI without tinnitus (n=14, 40%); group 3—control group, BI without TBI (n=16, 45.7%).

Table 1 presents summary data from a study involving three separate groups, detailing measures of anxiety, depression and sleep quality.

The Shapiro-Wilk test was applied to assess the normality of data distribution to three variables (HADS anxiety, HADS depression, PSQI) across the groups, revealing: group 1: HADS anxiety p=0.502; HADS depression p=0.294; PSQI p=0.421. Group 2: HADS anxiety p=0.192; HADS depression p=0.909; PSQI p=0.091. Group 3: HADS anxiety p=0.114; HADS depression p=0.628; PSQI p=0.896. We used analysis of variance to compare the quality among the groups that fit the normal distribution profile. HADS Anxiety: F-statistic=3.92, p=0.030. HADS Depression: F-statistic=10.85, p=0.00025.PSQI Sleep Quality: F-statistic=29.27, p=5.92e-08. To determine the differences between specific groups, we used post hoc tests, specifically the Tukey test (table 2).

The results confirm that tinnitus correlates with a significant increase in anxiety and depression with significant differences in sleep quality between the groups (F-statistic=29.27, p<0.001). A potential negative impact of tinnitus on the psychological state of military personnel who have sustained TBI has been identified. Tinnitus can be considered an independent factor in worsening sleep quality and adaptation. The main limitation of our study is the relatively small sample size (n=35) and the inclusion of only men in the study group. This suggests that that should be considered when assessing the condition of patients with various forms of BI.

Table 1 Descriptive analysis

Groups	Mean HADS anxiety	SD HADS anxiety	Mean HADS depression	SD HADS depression	Mean PSQI	SD PSQI	Mean age	Percentage
1	11.60	5.37	15.20	2.39	14.80	1.30	35.40	14.29
2	8.00	3.55	9.07	3.85	11.36	2.71	36.07	40.00
3	6.50	2.92	6.81	3.47	6.69	2.15	31.50	45.71

HADS, Hospital Anxiety and Depression Scale; PSQI, Pittsburgh Sleep Quality Index.

Table 2 Post hoc tests

Comparison	Mean difference HADS anxiety	P values (Tukey)	Mean difference HADS depression	P values (Tukey)	Mean difference PSQI	P values (Tukey)
Group 1 vs group 2	3.60	0.145	6.13	0.006	3.44	0.020
Group 1 vs group 3	5.10	0.023	8.39	<001	8.11	<001
Group 2 vs group 3	1.50	0.492	2.26	0.201	4.67	<001

HADS, Hospital Anxiety and Depression Scale; PSQI, Pittsburgh Sleep Quality Index.

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