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New diagnostic criteria for insomnia and the association between insomnia, anxiety and depression

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BACKGROUND

The diagnostic criteria for insomnia in the Diagnostic Statistical Manual of Mental Disorders, version 5 (DSM-5), have been changed. The same changes are expected to be made in the International Classification of Diseases, version 11 (ICD-11). In this study, we examine the impact of the changes in the diagnostic criteria for insomnia on the association between insomnia, anxiety and depression.

MATERIAL AND METHOD

The study is based on a questionnaire survey with 68 questions that can be found on the website of the Norwegian Competence Centre for Sleep Disorders. The survey began in 2012, and our data were retrieved in 2016. The survey included validated questionnaires for insomnia, anxiety and depression: the Bergen Insomnia Scale and the Hospital Anxiety and Depression Scale (HADS).

RESULTS

A total of 48 932 participants met the DSM-IV diagnostic criteria for insomnia. Of these, 42 873 (87.6 %) also met the DSM-5 diagnostic criteria for insomnia, while the remaining 6059 (12.4 %) did not satisfy the new criteria. Of those who met the DSM-IV diagnostic criteria for insomnia, 46 704 also responded to the questions on anxiety and depression. The prevalence of possible anxiety (HADS-A ≥ 8) among those who met the new criteria was 25 708 (62.9 %), while the prevalence of possible depression (HADS-D ≥ 8) was 15 591 (38.1 %). Among the participants who did not satisfy the new criteria, the prevalence was significantly lower: possible anxiety 2791 (48.1 %) and possible depression 1763 (30.4 %) (both $p < 0.001$).

INTERPRETATION

The study indicates that the new diagnostic criteria for insomnia strengthened the association between insomnia, anxiety and depression. This may mean that with the new diagnostic criteria, more patients with insomnia will have comorbid mental disorders.

In the period 1999/2000–2009/10, the prevalence of insomnia in Norway rose from 11.9 % to 15.5 % (1). A study published in 2018 showed a prevalence of 20 % (2). Insomnia leads to greater risk of developing mental disorders (3–5). The prevalence of clinically significant anxiety and depression has been shown to be 10–17 times higher among people with insomnia compared with those without insomnia (4). Meanwhile it has been demonstrated that the prevalence of insomnia is considerably higher among patients with anxiety and depression than in the normal population (6). Recent research indicates that the connection is bidirectional (7, 8).

In 2013, the fifth version of the classification system DSM (Diagnostic Statistical Manual of Mental Disorders) was published, in which the diagnostic criteria for insomnia were changed. One of the major changes was the removal of non-restorative sleep (poor sleep quality) as a symptom of insomnia. This was done in order to distinguish more clearly between insomnia and other sleep disorders, e.g. obstructive sleep apnoea, where non-restorative sleep is a common symptom. Therefore, the diagnosis of insomnia in DSM-5 requires difficulty initiating or maintaining sleep in addition to impaired daytime functioning or clinically significant discomfort because of sleep problems. In contrast, DSM-IV required that the patient either had difficulty initiating and/or maintaining sleep or problems with non-restorative sleep in addition to impaired daytime functioning.

In 2018, the first draft of ICD-11 (International Classification of Diseases, 11th Revision) (9) appeared. As in the case of DSM-5, non-restorative sleep has been removed from the diagnostic criteria for insomnia. The final version was approved in 2019 and will be introduced in due course in Norway.

The objective of this article was to examine the impact of the change in the diagnostic criteria for insomnia on the prevalence of insomnia and the association between insomnia, anxiety and depression.

Material and method

An online questionnaire survey of people who stated that they had a sleep problem started

up in February 2012 following advertisements in the Dagbladet newspaper and on TV2. Since then, the questionnaire has been available on the website of the Norwegian Competence Centre for Sleep Disorders (www.sovno.no). The participants responded to a validated questionnaire on insomnia, anxiety and depression.

We retrieved our data in June 2016, and a total of 77 786 persons had answered all or parts of the questionnaire. Altogether 53 540 participants had answered the questions on insomnia, and 50 942 had answered the questions on anxiety and depression.

No personally identifiable data were collected. The Regional Committees for Medical and Health Research Ethics regarded this as a quality assurance project, not a research project. Therefore, it was unnecessary to apply for ethical approval.

MEASURING INSTRUMENTS

The insomnia diagnosis was determined through use of the Bergen Insomnia Scale (BIS). The scale as developed and validated on the basis of the DSM-IV criteria for insomnia and consists of six questions (10). The first three deal with difficulty initiating asleep, awakening during sleep and early morning wakening. Question 4 asks whether the patient feels rested after sleep, and questions 5 and 6 deal with daily functioning and dissatisfaction with sleep. Each question is ranked on a scale from 0–7 according to how many days per week the patient has experienced this in the previous month (10).

A score of ≥ 3 for one or more of the first four questions combined with a score of ≥3 on one or both of the last two questions satisfy the DSM-IV criteria for insomnia (10). Since non-restorative sleep was removed from the DSM-5 diagnostic criteria, question 4 on feeling rested after sleep will no longer influence the insomnia diagnosis. Thus, a score of ≥ 3 on one or more of the first three questions combined with a score of ≥ 3 on question 5 and/or 6 will meet the DSM-5 criteria.

This study was based on participants who met the DSM-IV diagnostic criteria (N = 48 932). These were divided into two groups, one of which satisfied the DSM-5 criteria (n = 42 873), while the other group did not meet the new criteria (n = 6059). The latter group did not have difficulty initiating or maintaining sleep but met the earlier diagnostic criteria because they experienced problems with non-restorative sleep (NRS insomnia).

Anxiety and depression were diagnosed with a validated Norwegian version of the Hospital Anxiety and Depression Scale (HADS). This form consists of 14 questions, half of which measure anxiety symptoms and half of which measure the symptoms of depression. Each question is scored from 0–3, which indicates the degree of the symptom in the previous week. In line with earlier studies, a total score of ≥ 8 in one of the two question categories – anxiety and depression – was used as a threshold for possible diagnosis (11).

STATISTICS

The chi-squared distribution test was used to compare the prevalence of possible anxiety and depression (HADS ≥ 8) among participants with DSM-5 insomnia disorder and participants with insomnia with non-restorative sleep. The significance value was set at $p < 0.05$. All analyses were carried out using SPSS version 25.

Results

The mean age of the participants was 35.1 years (standard deviation 13.5 years), median 33 years. More women (60.4 %) than men (39.6 %) participated. A total of 48.9 % had attended a university or university college and 68.4 % of the participants lived in an urban municipality.

Altogether 53 540 (68.8 %) of the participants responded to the questions on insomnia. Of these, 48 932 (91 %) met the DSM-IV diagnostic criteria. A total of 50 942 (65.5 %) responded to the questions on anxiety and depression. Of these, 29 960 (58.8 %) had possible anxiety,

while 18 017 (35.4 %) had possible depression (Table 1).

Table 1

Distribution of demographic data among 77 786 persons with sleep problems who took part in an online questionnaire survey on the website of the Norwegian Competence Centre for Sleep Disorders in the period 2012–16.

Variable	**Number** (%)
Gender	
Female	47 012 (60.4)
Male	30 774 (39.6)
Age (years)	
15–24 years	20 652 (26.5)
25–34 years	21 032 (27.0)
35–44 years	16 942 (21.8)
45–54 years	11 268 (14.5)
55–64 years	5851 (7.5)
65+	1995 (2.6)
Not specified	46 (0.1)
Place of residence	
Town	53 210 (68.4)
Rural area	24 149 (31.0)
Not specified	427 (0.5)
Civil status	
Married	22 601 (29.1)
Unmarried	28 905 (37.2)
Cohabiting	21 047 (27.1)
Divorced	3173 (4.1)
Separated	940 (1.2)
Widow/Widower	1044 (1.3)
Not specified	76 (0.1)
Education	
Primary and lower secondary school	9077 (11.7)
Upper secondary school	10 375 (13.3)
Vocational school/Technical college	20 214 (26.0)
University/University college	38 058 (48.9)
Not specified	62 (0.1)
Insomnia	
According to DSM-IV[1]	48 932 (62.9)
According to DSM-5[1]	42 873 (55.1)
NRS insomnia[2]	6059 (7.8)
No insomnia	4608 (5.9)
Not specified	24 246 (31.2)
Anxiety/depression	
Possible anxiety and/or depression	33 119 (42.6)
Possible anxiety (HADS-A[3] ≥ 8)	29 960 (38.5)
Possible depression (HADS-D[4] ≥ 8)	18 017 (23.2)
No anxiety or depression	17 823 (22.9)
Not specified	26 844 (34.5)

[1]DSM-IV and DSM-5 = Diagnostic and Statistical Manual of Mental Disorders 4th and 5th editions.

[2]NRS insomnia = Insomnia with non-restorative sleep. Participants who answered that they do not feel adequately rested after sleep but that they have no difficulty initiating and/or maintaining sleep, i.e. they meet the DSM-IV diagnostic criteria for insomnia, but not the

DSM-5 criteria.

[3]HADS-A = Hospital Anxiety and Depression Scale – anxiety

[4]HADS-D = Hospital Anxiety and Depression Scale – depression

Of the 48 932 participants who met the DSM-IV diagnostic criteria for insomnia, altogether 42 873 (87.6 %) also met the DSM-5 criteria. The remaining 6059 (12.4 %) reported problems with non-restorative sleep and did not meet the new diagnostic criteria.

A total of 46 704 of the participants who satisfied the DSM-IV criteria for insomnia, also answered the questions on anxiety and depression (HADS). There was a significantly higher prevalence of possible anxiety among participants with insomnia according to the DSM-5 criteria compared with participants with insomnia with non-restorative sleep. Of the participants with DSM-5 insomnia disorder, 62.9 % had possible anxiety, compared with 48.1 % of the participants with insomnia with non-restorative sleep ($p < 0.001$). Of the participants with DSM-5 insomnia disorder, 38.1 % had possible depression compared with 30.4 % of the participants with non-restorative sleep ($p < 0.001$) (Table 2).

Table 2

Online questionnaire survey among participants with sleep problems in the period 2012–16. Differences in the prevalence of anxiety and depression among participants with insomnia with non-restorative sleep and participants with insomnia according to the DSM-5 criteria. The percentages were calculated on the basis of the number of participants with possible insomnia who also answered the questions on anxiety and depression.

	NRS insomnia[1] (n = 5806) Number (%)	**DSM-5[2] insomnia disorder (n = 40 898) Number (%)**	**P-value**
Possible anxiety (HADS-A[3] ≥ 8)	2791 (48.1)	25 708 (62.9)	< 0.001
Possible depression (HADS-D[4] ≥ 8)	1763 (30.4)	15 591 (38.1)	< 0.001

[1]NRS insomnia = Insomnia with non-restorative sleep. Participants who have answered that they feel inadequately rested after sleep but do not have difficulty initiating and/or maintaining sleep, i.e. they meet the DSM-IV diagnostic criteria, but not the DSM-5 criteria.

[2]DSM-5 = Diagnostic and Statistical Manual of Mental Disorders, 5th edition.

[3]HADS-A = Hospital Anxiety and Depression Scale – anxiety

[4]HADS-D = Hospital Anxiety and Depression Scale – depression

Discussion

The study showed a considerable reduction in the prevalence of possible insomnia on removal of the diagnostic criterion 'non-restorative sleep'. Thus, there was a considerable percentage of participants who had earlier received the insomnia diagnosis on the basis of non-restorative sleep who had no difficulty initiating or maintaining sleep. Using the new criteria for insomnia results in a considerable reduction in prevalence, as shown previously in a study of a normal population (12).

One of the arguments for changing the diagnostic criteria is that it is more likely that those with non-restorative sleep suffer from sleep disorders other than insomnia, such as obstructive sleep apnoea. This is the most common sleep disorder after insomnia (13). One of the main symptoms of sleep apnoea is increased tiredness during the day due to poor sleep quality. People with non-restorative sleep may not have insomnia in the usual sense but have sleep apnoea or other sleep disorders that make them feel inadequately rested

after sleep. Removing non-restorative sleep from the diagnostic criteria for insomnia may exclude those who previously received the diagnosis on an incorrect basis, thus refining the insomnia diagnosis. Insomnia and sleep apnoea are treated differently, and more accurate diagnosis will have a bearing on the choice and efficacy of treatment.

Our study showed a high prevalence of possible anxiety and depression among participants with insomnia according to the DSM-5 criteria. In comparison, the HUNT-3 study (Nord-Trøndelag Health Study) has demonstrated a prevalence of possible anxiety of 34.6 % and of possible depression of 29.8 % among participants with insomnia (7). HUNT-3 used the HADS score to determine the anxiety and depression diagnoses, as we also did in our study. In contrast, insomnia was not diagnosed using a validated questionnaire. A possible explanation of the difference in prevalence may be, therefore, the use of different criteria to determine the diagnosis. Another possible explanation is that the sample in HUNT-3 was random rather than including persons who had reported sleep problems as a point of departure. Finally, the HUNT-3 study was conducted in the period 2006–08, and the prevalence of insomnia has increased in the general population since then (1, 2).

The study showed a significantly higher prevalence of possible anxiety and depression among participants who met the DSM-5 criteria for insomnia than among those who did not meet the new criteria. Earlier studies have shown a clear association between insomnia, anxiety and depression (4, 7, 8). Our findings indicate that the new diagnostic criteria strengthen this association. The association between sleep apnoea, anxiety and depression (14) has not been shown to be as strong as that between insomnia, anxiety and depression (4, 7, 8). More accurate diagnosis of people with insomnia may therefore explain why the association between insomnia, anxiety and depression is strengthened when using the new diagnostic criteria. Therefore, we recommend further research on the prevalence of other sleep disorders among those with non-restorative sleep.

The introduction of new diagnostic criteria will probably mean that a larger percentage of patients with insomnia will have comorbid mental disorders. Thus, it will be important to continue to focus on diagnosing and treating comorbid mental disorders in patients with insomnia.

STRENGTHS AND LIMITATIONS

A major strength of the study was the large number of participants. This made it easier to establish statistical differences. However, there is a danger that the differences are not necessarily clinically relevant. A limitation of the study was that many participants did not answer the questions about insomnia, anxiety and depression. It is important to emphasise that the dataset was selected. Many participants were recruited as a result of publicity in the Dagbladet newspaper or on TV2.no. In addition, the participants were obliged to report a sleep problem to take part in the survey. Therefore, the survey gives no indication of the actual prevalence of insomnia, anxiety and depression in the population. Another weakness of this type of survey is that the diagnosis is not made through direct contact with patients. Consequently, we lose the opportunity to acquire vital clinical information that can affect the setting of the diagnosis. Moreover, there will be greater uncertainty as to whether the participant has understood the question correctly. In order to arrive at a precise diagnosis, a clinical interview is necessary.

A strength of the study was that a validated questionnaire for insomnia, anxiety and depression was used. The questionnaires (Bergen Insomnia Scale and HADS) have been widely used in the field of sleep research and in major studies of anxiety and depression. A weakness of the Bergen Insomnia Scale is that it is validated on the basis of DSM-IV criteria rather than DSM-5 criteria. A weakness of the HADS questionnaire is that the questions are limited to covering the non-vegetative symptoms of anxiety and depression, which means that symptoms such as tiredness, fatigue, sleep problems and headache are not included in the questionnaire (11).

Conclusion

The study showed that removing non-restorative sleep as a symptom of insomnia from the diagnostic criteria strengthens the association between possible insomnia and possible anxiety and depression. The prevalence of possible anxiety and depression was higher among the participants who met the new criteria for insomnia than among those who did not meet the new criteria.

MAIN FINDINGS

Altogether 12.4 % of participants who met the earlier criteria for insomnia did not satisfy the new criteria.

The prevalence of possible anxiety among participants who met the new diagnostic criteria for insomnia and among those who did not meet the new criteria is 62.9 % and 48.1 % respectively.

The prevalence of possible depression among participants who met the new diagnostic criteria for insomnia and among those who did not meet the new criteria is 38.1 % and 30.4 % respectively.

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