Presleep thoughts and dysfunctional beliefs in subjects of insomnia with or without depression: Implications for cognitive behavior therapy for insomnia in Indian context

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ABSTRACT

Background: Presleep thoughts may vary between patients of insomnia with or without depression. They are important for cognitive behavior therapy for insomnia (CBT-I), but they have never been systemically examined in Indian population.

Materials and Methods: Patients with insomnia (>1 month) who were willing to undergo CBT-I were included in this study after obtaining informed consent. They were requested to fill a sleep diary and return after 15 days. At the time of intake, diagnosis of depression and anxiety disorders was made according to Diagnostic and Statistical Manual - IV-Text Revision. They were encouraged to provide information regarding presleep thoughts through open-ended and then, close-ended questions. Dysfunctional attitudes and beliefs about sleep were assessed with Hindi version of “dysfunctional beliefs and attitudes scale-brief version”. Hindi version of “insomnia severity index” was used to assess the severity of insomnia. Subjects were divided into two-groups - insomnia without depression (I) and insomnia with major depressive disorder (I-MDD+).

Statistical Analysis: It was done with the help of SPSS v 21.0. Descriptive statistics was calculated. Proportions between groups were tested with Chi-square analysis and categorical variables were compared using independent sample t-test.

Results: This study included a total of 63 subjects, out of which 60% were women. Mean age of the whole group was 41.7 ± 11.8 years. About 40% of all the subjects were diagnosed as having I-MDD+. Forty-one percent of the subjects had clinically significant anxiety. Both groups - I and I-MDD+ had comparable proportion of female subjects ($\chi^2 = 0.002; P = 0.96$) and there was no difference regarding precipitating factors for insomnia ($\chi^2 = 0.97; P = 0.61$). They were also comparable with regards to sleep-related measures, themes of presleep thoughts, and dysfunctional beliefs and attitudes about sleep and insomnia severity. Major themes of presleep thoughts included family issues and health issues. Only a small proportion had recurrent thoughts related to insomnia and its consequences.

Conclusion: Insomnia is a co-morbid illness with depression and it needs to be separately addressed during therapy. CBT-I should include the element of problem-solving technique, especially when we are dealing with the Indian population.

Key words: Cognitive behavior therapy for insomnia, depression, insomnia, presleep thoughts

INTRODUCTION

Insomnia is a common disorder with population prevalence of around 9%. It is frequently co-morbid with psychiatric disorders.

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disorders, especially depression and both are known to have a bi-directional relationship. Traditionally, insomnia has been viewed as a symptom of depression which often remained as a residual symptom after successful treatment of depression. Carney et al. analyzed the prevalence of insomnia after remission of depression and they found that a sizable number of patients had initial, maintenance, or terminal insomnia, being more than 20% in each of these groups. Further, the prevalence of insomnia did not differ between the groups which received pharmacotherapy or cognitive behavior therapy for depression. They suggested that these patients required insomnia specific therapy in addition to the treatment of depression. Treatment of the insomnia is of paramount importance as insomnia has been found to be the predictor of future episodes of depression across a number of studies.

A number of options are available for the treatment of insomnia, ranging from benzodiazepines, “z” drugs to sedating antidepressants, and cognitive behavior therapy for insomnia (CBT-I). CBT-I has been found to be effective, especially in cases of chronic insomnia and has also been found to be effective across a number of groups with insomnia. CBT, in general, addresses the maladaptive beliefs that initiate a vicious cycle where disease and these beliefs work in a feed-forward manner.

People with insomnia have been found to have a number of dysfunctional beliefs and they tend to ruminate regarding the insomnia symptoms which start the vicious cycle and perpetuate the insomnia. These maladaptive beliefs have been found across all age groups and even in children. Though a number of studies have been conducted in the Western countries which have examined the dysfunctional beliefs, worries, and ruminations in people suffering from insomnia, this has never been done in the Indian population.

Beliefs are usually adopted from the society through interaction; they may be result of personal experiences, and are influenced by availability of information on any given subject. Indian society differs a lot with reference to these measures from Western population. Hence, we planned to assess the sleep-related beliefs and presleep cognition in patients of insomnia.

Further, patients with depression often have cognitive distortions, which may theoretically influence the sleep-related beliefs and increase their negative valence. However, to the best of our knowledge, this has never been examined. Thus, another aim of this study was to compare the sleep-related beliefs and presleep cognition between “insomnia without depression” and “insomnia with depression.” Understanding these issues will help in developing/modifying the CBT-I according to the Indian population.

**MATERIALS AND METHODS**

This study was conducted in the Sleep Clinic of a tertiary care teaching institute. The study was conducted after acquiring approval from the Ethics Committee of the Institute. Consecutive patients presenting to the clinic with insomnia were explained the rationale of this study. Those who agreed to participate in this study were encouraged to enroll themselves for the CBT-I and a written informed consent was taken from the participants.

Those who were not willing for the CBT-I were excluded. In addition, patients with severe major depressive disorder (MDD), psychotic disorders, substance dependence, intoxication or withdrawal, abusing sleeping pills, having bipolar disorders, delirium, neurocognitive disorders, neurological or other medical disorders that may influence cognitive abilities or sleep quality were excluded. Subjects below the age of 18 years, those above 70 years, and pregnant females were also excluded from the study. Similarly, patients with narcolepsy, obstructive sleep apnea, and sleep-related movement disorders were also excluded.

Their demographic data and illness-related details were noted in a semi-structured proforma. They were specifically questioned regarding their primary problem with sleep (difficulty falling asleep; recurrent awakenings; early morning awakening; or nonrestorative sleep) for which they were most concerned. Then, they were asked to provide details regarding associated sleep problem from any of these categories, which had a negative impact on their life.

Diagnosis of MDD and anxiety disorders was made according to Diagnostic and Statistical Manual - IV-Text Revision (DSM-IV-TR) through a clinical interview. Family history of sleep and psychiatric disorders was also gathered.

Sleep diary data

The patients were provided with a sleep diary and they were explained how to fill the information. They returned the diary after 15 days, before the first session of CBT-I. The diary was used to calculate the bed-time, sleep onset latency (SOL), wake after sleep onset (WASO), wake time, wake after sleep offset (WASF), sleep quality, and napping.

Presleep cognitive themes

It was assessed during the first session of the CBT-I. All the subjects were asked regarding their presleep cognitive themes in an open-ended interview. They were asked “What keeps on running in your mind usually, when you are not able to fall asleep?” Their responses were recorded and they were asked to provide details regarding the frequency. Then, they were again asked - “Does anything else also come to your mind, when you are not able to fall asleep?” Responses with the frequency of more than two nights a
week were recorded, till the subjects dissociated regarding any other frequent themes.

Next phase of the interview had close-ended questions. A list of some common themes was prepared with the help of available literature and they were asked “Did you ever found these kinds of thoughts running when you were not able to catch the sleep?” [Table 1]. If they had an affirmative response, they were asked regarding the frequency of the thoughts and thoughts recurring for more than two nights a week were recorded.

Then, they were asked the degree to which they considered that these thoughts were rational. They were asked to make a mark on a visual analog scale where 1 would mean “completely irrational” and 10 would be “completely rationale.” They were also asked to provide the effect of these thoughts on their mood - whether they felt anxious, restless, angry, guilty, angry, sad, and helpless or any other emotion not mentioned there.

After this, their responses on the following scales were noted - dysfunctional beliefs and attitudes about sleep-brief version (DBAS-16)[18] and insomnia severity index (ISI).[19] Details of these instruments are given below.

### Dysfunctional beliefs and attitudes about sleep-brief version

These were measured using a scale - DBAS-16.[18] This scale has been found to have good internal consistency in both clinical and research samples. It measures the beliefs in four major domains - perceived consequences of insomnia, worry or helplessness regarding insomnia, expectations with sleep, and beliefs regarding medication.[16] The scale contains 16 items that include common dysfunctional beliefs. Responses are to be marked on a 100 mm long line having 10 equal divisions. One end has “0” that depicts strong disagreement and “10” on the other end, corresponding to strong agreement with the respective item.

A validated translation of the scale is also available in Hindi language, which was used in this study.[20] This version has also been found to have good internal consistency (Cronbach’s alpha = 0.90). Scoring was done according to the procedure described earlier.[10]

### Insomnia severity index

ISI is a short scale containing seven items that measure difficulties in initiating or maintaining the sleep in addition to early morning awakenings. It also measures the effect of insomnia on daytime activities during the past 7 days. The answers are provided on a four point Likert scale.[19] In this study, a validated version in Hindi was used.[21]

### Statistical analysis

Statistical analysis was done with the help of SPSS version 21 (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.). Descriptive statistics was calculated. The subjects were divided into two categories -I-MDD+ and insomnia without MDD (I). Independent sample t-test was applied to the continuous variables and Chi-square test was applied to compare categorical variables.

### RESULTS

This study included a total of 63 subjects, out of which 60% were women. Mean age of the whole group was 41.7 ± 11.8 years. Forty percent of all the subjects were diagnosed as having MDD. Forty-one percent of the subjects had clinically significant anxiety that met the criteria for various anxiety disorders viz., panic disorder (11%); generalized anxiety disorder (8%); anxiety not otherwise specified (19%); and social phobia (3%). Thirteen percent of the subjects were illiterate; 36.6% completed at least school education; 41.3% had graduate degree; and 9.6% studied up to postgraduate level.

About 61.9% reported difficulty in falling asleep; sleep maintenance difficulty and early morning awakenings were reported by 11.1% and 9.5% subjects, respectively, and 17.5% complained of nonrefreshing sleep as the primary sleep complaint. Almost all the subjects had associated sleep-related difficulty from any of these categories which was considered as associated sleep problem. Most frequent associated sleep complaint was nonrefreshing sleep (60.3%) and recurrent awakenings at night (17.5%).

About 68.3% could not identify any precipitating factor for insomnia whereas 23.8% reported stress and 7.9% medicines as precipitating factors.

### Comparison between major depressive disorder with and without insomnia

Both groups had comparable proportion of female subjects ($\chi^2 = 0.002; P = 0.96$) and precipitating factor for insomnia ($\chi^2 = 0.97; P = 0.61$). Nonrestorative sleep was more frequent in MDD group (32% vs. 7.9% in insomnia without MDD), whereas initial insomnia was more frequent in
subjects without MDD (71.1% vs. 48% in I-MDD+). However, the differences were statistically not significant. Comparison of categorical variables is depicted in Table 2. Anxiety disorders were equally prevalent among both groups.

Both the groups did not differ with respect to the categories of the thoughts that ruminate before sleep [Figure 1]. Interesting to note that, nearly 57% subjects in each category could not report any recurring thoughts themselves and only a small number of subjects were worried with insomnia. Ruminations regarding family-related issues included worries regarding children’s settlement, aging parents, break-up, marriage of family member, and poor inter-personal relationships. Health-related ruminations included effect of co-morbid diseases on family members, own health, and disabled child. Sleep-related ruminations included thoughts of “when would I fall asleep,” “how to spend night,” and daytime consequences of insomnia.

In the close-ended interview, patients were described few categories of presleep thoughts, already known in people with insomnia. Their results are depicted in Table 1. Both groups did not differ with regards to degree with which they considered their beliefs as genuine (2.8 ± 1.2 in insomnia without MDD vs. 3.3 ± 0.6 in I-MDD+; P = 0.6). Figure 2 depicts the emotional responses to the presleep thoughts.

**DISCUSSION**

This study showed that the insomnia patients with and without depression did not differ with regards to the dysfunctional beliefs and attitudes regarding sleep and presleep cognitive themes. Further, they did not differ on sleep-related measures, for example, SOL, WASO, WASF, and sleep quality. They did not differ on the sub-scales of DBAS-16 as well as on the measures of insomnia severity.

Contrary to the Western literature, only a small number of people were worried about insomnia and its effect on their health, relationships, and work. Most common thoughts revolved around family and own health and most common emotional responses to these thoughts were anxiety and restlessness. Moreover, more than half of the subjects could not provide any information regarding presleep thoughts.

The findings of this study confirm our present understanding with the insomnia which has been reflected in DSM-5[22] and International Classification of Sleep Disorders, 3rd edition.[23] Both these systems have removed the dichotomy between primary and secondary insomnias in view of recent evidences and insomnia is now considered as a co-morbid

![Figure 1: Comparison of presleep thoughts between insomnia subjects with and without depression](image1)

![Figure 2: Emotional responses to presleep thoughts in both groups](image2)

| Table 2: Comparison of insomnia without major depressive disorder and insomnia with major depressive disorder |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Variable                      | Insomnia without MDD (n=38) | Insomnia with MDD (n=25) | P    |
|------------------------------|-------------------------------|--------------------------|------|
| Age                          | 43.6±11.5                    | 38.8±11.9                | 0.1  |
| Duration present episode (months) | 1.6±1.7                      | 1.8±1.3                  | 0.6  |
| Frequency (nights/week)       | 5.8±1.4                      | 6.3±1.1                  | 0.2  |
| Total duration of insomnia (months) | 73.7±99.8                    | 49.5±45.1                | 0.2  |
| Sleep onset latency (min)     | 120.6±106.3                  | 146.6±166                | 0.4  |
| Wake after sleep onset (min)  | 177.1±149.1                  | 194.4±177                | 0.7  |
| Frequency of nocturnal awakenings (per night) | 3.1±3.2                      | 3±1.3                    | 0.9  |
| Wake after sleep offset (min) | 45.4±78.6                    | 23.3±17.4                | 0.2  |
| Napping (days/week)           | 4±3.1                        | 5.8±2.4                  | 0.1  |
| Total score on DBAS-16        | 10.9±3.1                     | 11.6±2.3                 | 0.3  |
| Worry subscale                | 38.2±11.5                    | 40.3±9.9                 | 0.4  |
| Effect of insomnia subscale   | 31.8±10.2                    | 33.6±7.7                 | 0.4  |
| Medication subscale           | 14.2±5.9                     | 16.2±4.2                 | 0.1  |
| Expectation subscale          | 10.3±3.4                     | 11.4±3.4                 | 0.2  |
| Insomnia severity index (score) | 17±4.4                       | 17.4±4                   | 0.7  |

MDD – Major depressive disorder; DBAS-16 – Dysfunctional beliefs and attitudes scale-brief version.
disorder presenting with the psychiatric disorders that run an independent course, unless adequately and appropriately treated. This study has also shown that subjects of insomnia with or without depression did not differ with reference to the dysfunctional beliefs and presleep cognitive themes, confirming the results of earlier studies which have shown that cognitive processes did not differ across insomnia groups. Thus, with the available recent evidences, insomnia should be considered as a co-morbid illness with psychiatric and medical disorders, rather than a symptom or residue of depression and should be energetically treated.

In this study, we found that many of the patients were not able to provide details regarding the presleep thoughts on open-ended questioning and only small number of subjects were worried regarding insomnia both on open-ended or close-ended questioning. Most of the studies have used DBAS-16 during the CBT-I, and we could not find any study where open-ended questioning was done. Thus, results in this domain could not be compared.

Thoughts and beliefs are usually governed by the available knowledge. A lot of information regarding insomnia and its adverse effects is available on the internet for the free access to the general population. This could possibly the reason that patients in the West have major presleep thoughts related to “effect of insomnia and its effect on their health and life.” On the other hand, the Indian population (or at least subjects included in this study) usually does not usually search and read the information available on the internet regarding any of the disorders. Moreover, most of the information is available in English which further limits the access. Finally, people are not aware regarding the adverse effects of sleep on their health as sleep disorders are not in the priority areas of the government, which usually disseminates the important health-related information in local language. To add more, only a handful of physicians in India are working solely or primarily in Sleep Medicine. These factors limit the dissemination of knowledge regarding insomnia and other sleep disorders and could be the reason why most of subjects included in this study were not worried about their insomnia.

However, according to this study, like patients of insomnia from the West, Indian patients also ruminate, but their thoughts are related to other problems of life. These problems can be solved with problem-solving technique, and a recent study had demonstrated the efficacy of problem-solving technique in the management of insomnia. Thus, we may need to add the problem-solving technique in the CBT-I when we are dealing with the Indian population.

Whether improving the dysfunctional beliefs would improve sleep quality is also questionable. At least one study has found that improvement in insomnia with the CBT-I was not found to parallel with the improvement in dysfunctional beliefs. But, this evidence is not sufficient to question the efficacy of CBT-I. This must be remembered that CBT-I is not directed just toward the cognitive distortions, rather it includes behavioral modifications, for example, improving the sleep hygiene, relaxation techniques, sleep restriction therapy, stimulus control therapy, etc., to improve the sleep. Thus, improving the sleep-related behavior may improve the sleep quality even with moderate change in cognition.

Like any other study, this study also had some methodological limitations. First, since most of the patients chose pharmacotherapy over CBT-I, sample size was small. This should be overcome in future studies. Second, subjects with a number of co-morbidities were excluded to make the sample homogenous. This limits the generalization of results. Third, the leading questions regarding presleep thoughts were asked based on the Western evidence. There could be more themes that could emerge in the Indian context. This is an area open for future research. Fourth, a good number of patients had nonspecific anxiety and this could also have influenced the results. Fifth, it would have been interesting to note if the presleep cognitive thoughts differ between various types of insomnia (initial versus middle vs. terminal); severity of depression (mild, moderate, and severe) and finally, type of anxiety disorder, for example, generalized anxiety disorder versus panic disorder. However, a small sample size precluded us for analyzing these variables. This should be studied in future to refine the CBT-I. Sixth, it would have been interesting to analyze if the presleep thoughts differ between subjects with depression and anxiety disorders. This could not be done due to a substantial overlap between these two categories. Still, this is probably the first Indian study that has examined these issues and makes it important.

CONCLUSION

This study suggests that patients of insomnia with or without depression have comparable presleep thoughts and beliefs. Severity of insomnia also does not differ between these groups. Most of the subjects worry about the ongoing problems in their life, rather than to worry about insomnia. Thus, CBT-I has to include the problem-solving technique, at least in the Indian context.

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Conflicts of interest
There are no conflicts of interest.

REFERENCES

1. Ellis JG, Perlis ML, Neale LF, Espie CA, Bastien CH. The natural history of insomnia: Focus on prevalence and incidence of acute insomnia. J Psychiatr Res 2012;46:1278-85.
2. Perlis ML, Smith LJ, Lyness JM, Matteson SR, Pigeon WR, Jungquist CR, Tu X. Insomnia as a risk factor for onset of depression in the elderly. Behav Sleep Med 2006;4:104-13.
3. Baglioni C, Battagliese G, Feige B, Spiegelhalter K, Nissen C, Voderholzer U, et al. Insomnia as a predictor of depression: A meta-analytic evaluation of longitudinal epidemiological studies. J Affect Disord 2011;135:10-9.
4. Carney CE, Segal ZV, Edinger JD, Krystal AD. A comparison of rates of residual insomnia symptoms following pharmacotherapy or cognitive-behavioral therapy for major depressive disorder. J Clin Psychiatry 2007;68:254-60.
5. Glazer WM. Overview importance of recognizing and treating insomnia. J Clin Psychiatry 2006;67:3-4.
6. Okajima I, Komada Y, Nomura T, Nakashima K, Inoue Y. Insomnia as a risk for depression: A longitudinal epidemiologic study on a Japanese rural cohort. J Clin Psychiatry 2012;73:377-83.
7. Buysse DJ. Insomnia. JAMA 2013;309:706-16.
8. Siebern AT, Suh S, Nowakowski S. Non-pharmacological treatment of insomnia. Neurotherapeutics 2012;9:717-27.
9. O'Donohue WT, Fisher JE, editors. General Principles and Empirically Supported Techniques of Cognitive Behavior Therapy. General Principles and Empirically Supported Techniques of Cognitive Behavior Therapy; 2009. Available from: http://www.ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=psych6&NEWS=N&AN=2009-02305-000. [Last accessed on 2014 Sep 21].
10. Carney CE, Edinger JD, Morin CM, Manber R, Rybarczyk B, Stepanski EJ, et al. Examining maladaptive beliefs about sleep across insomnia patient groups. J Psychosom Res 2010;68:57-65.
11. Gregory AM, Cox J, Crawford MR, Holland J, Harvey AG; Steps Team. Dysfunctional beliefs and attitudes about sleep across insomnia patient groups. J Sleep Res 2013;9:567-75.
12. Gregory AM, Cox J, Crawford MR, Holland J, Harvey AG; Steps Team. Dysfunctional beliefs and attitudes about sleep in children. J Sleep Res 2009;18:422-6.
13. Grandner MA, Patel NP, Jean-Louis G, Jackson N, Gehman PR, Perlis ML, et al. Sleep-related behaviors and beliefs associated with race/ethnicity in women. J Natl Med Assoc 2013;105:4-15.
14. Hjelm KG, Bard K, Nyberg P, Apleqvist J. Beliefs about health and diabetes in men of different ethnic origin. J Adv Nurs 2008;50:47-59.
15. Beck AT. The evolution of the cognitive model of depression and its neurobiological correlates. Am J Psychiatry 2008;165:969-77.
16. American Sleep Disorders Association. The International Classification of Sleep Disorders: Diagnostic & Coding Manual. Westchester, IL: American Academy of Sleep Medicine; 2005.
17. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR). Washington DC: American Psychiatric Association; 2000.
18. Morin CM, Vallières A, Ivers H. Dysfunctional beliefs and attitudes about sleep (DBAS): Validation of a brief version (DBAS-16). Sleep 2007;30:1547-54.
19. Morin CM, Belleville G, Bélanger L, Ivers H. The insomnia severity index: Psychometric indicators to detect insomnia cases and evaluate treatment response. Sleep 2011;34:601-8.
20. Dhyani M, Rajput R, Gupta R. Hindi translation and validation of dysfunctional beliefs and attitudes about sleep (DBAS-16). Ind Psychiatry J 2013;22:80-5.
21. Lahan V, Gupta R. Tranlation and validation of the insomnia severity index in Hindi language. Indian J Psychol Med 2011;33:172-6.
22. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 5th ed. Arlington: American Psychiatric Association; 2013.
23. American Academy of Sleep Medicine. International Classification of Sleep Disorders. 3rd ed. Darian, IL: American Academy of Sleep Medicine; 2014.
24. Roth T. Comorbid insomnia: Current directions and future challenges. Am J Manag Care 2009;15 Suppl:S6-13.
25. Buysse DJ, Angst J, Gamma A, Ajdacic V, Eich D, Rüssler W. Prevalence, course, and comorbidity of insomnia and depression in young adults. Sleep 2008;31:473-80.
26. Huthwaite M, Miller H, McCartney J, Romans S. Dysfunctional cognitions about sleep in psychiatric patients. J Psychiatr Pract 2014;20:188-95.
27. Carney CE, Edinger JD, Manber R, Garson C, Segal ZV. Beliefs about sleep in disorders characterized by sleep and mood disturbance. J Psychosom Res 2007;62:179-88.
28. Pech M, O’Keaveney R. A randomized controlled trial of problem-solving therapy compared to cognitive therapy for the treatment of insomnia in adults. Sleep 2013;36:739-49.
29. Okajima I, Nakajima S, Ochi M, Inoue Y. Reducing dysfunctional beliefs about sleep does not significantly improve insomnia in cognitive behavioral therapy. PLoS One 2014;9:e102655.