

*Chapter*

## **AN OVERVIEW REGARDING INSOMNIA DISORDER: CONCEPTUALIZATION, ASSESSMENT AND TREATMENT**

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### **ABSTRACT**

Insomnia Disorder (ID) constitutes one of the most frequent sleep disorders and one of the most distressing disorders in modern societies. Besides, it affects largely the quality of life of the individuals. Also for this reason it is considered a public health problem. It is frequently associated with psychiatric disorders – in particular anxiety and depressive disorders – and other medical disorders such as chronic pain. Because of the clinical relevance of insomnia for several contexts (e.g., applied health settings, clinical training), it is important to have a realistic and useful framework of insomnia. Our aim for this chapter is to present a brief but actual overview over the main issues pertaining to the diagnostic classification of insomnia, reporting the DSM-5, the ICSD-AASM-3 and ICD-10 diagnostic criteria; the assessment – focusing the most recommended available techniques to evaluate insomnia – and the evidence-based interventions discussing the most recent approaches, outlining the practical aspects, as well as their benefits and limitations.

**Keywords:** insomnia, diagnostic, assessment, psychological therapies, sleep

## INTRODUCTION

**Insomnia Disorder** (ID) is one of the most prevalent sleep disorders. It concerns to difficulties in sleep-onset, nocturnal awakenings, early awakenings, or non-repairing sleep which cannot be attributed to other medical or psychiatric comorbid disorder (AASM, 2005). Moreover, there are two key features specifically related to ID: the hyperarousal of different human systems such as cognitive or neurobiological ones, and the maladaptive conditioning between sleep responses and arousal-provoking stimuli (Morin & Espie, 2003).

The word “insomnia” comes from Latin *in* which means “no” and *somnus* which means “sleep,” thus expressing an inability to obtain sleep either in quantity or quality. Approximately 10 to 15% of general population presents insomnia complaints, being the most frequent sleep disorder. It is estimated an incidence of 3-5% new cases every year (Drake & Roth, 2006)<sup>1</sup>.

From a historical point of view we identify that the first reflections on insomnia begin by the year 300 B.C. when Democritus associates the insomnia complaints with a poor and unhealthy diet. In the Bible, it is suggested that sleep inability would be related to an excessive worry with material possessions. In the arts and literature, Shakespeare makes numerous references to insomnia in his plays leading us to assume, according to the interpretation of some authors, that he himself would suffer from this problem (Head, 1886). In 1869 Hammond writes the first structured book dedicated to insomnia. However, it will be in 1920, after the introduction of the first hypnotic drugs, that research concerning insomnia will assume more relevance, particularly the proposal of therapeutic techniques to relieve it (Espie & Morin, 2012).

The specific designation “psychophysiological insomnia” first appears in a paper by Hauri and Fischer (1986) and according with these authors, points to a type of insomnia which “develops secondary to chronic, somatized tension and negative conditioning” (p.38). The conceptual deconstruction of the term (i.e., psychophysiological) refers to an interplay between psychological and biophysiological factors, outlining the features related with learning mechanisms which decades earlier had been studied in a systematic manner by experimental psychologists.

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<sup>1</sup> One must note that the values may be different according to the insomnia definition adopted by the authors of the studies (Buysse et al. 2006; Schwartz & Carney, 2012).

## 1. CONCEPTUALIZATION OF INSOMNIA

In terms of sleep disorders classification, more specifically regarding insomnia, one should stress that there are three main manuals: The Diagnostic and Statistical Manual of Mental Disorders (DSM-5, APA, 2013), The International Classification of Sleep Disorders (ICSD-2, AASM, 2005) and the International Classification of Diseases (ICD-10, WHO, 1992). However, in the majority of studies the DSM-IV, now updated to DSM-5, and ICSD-2 are the ones more used. In tables 1 and 2 are presented the respective diagnostic criteria. In table 3, we present the diagnostic criteria of the more recent International Classification of Sleep Disorders (ICSD-3, AASM, 2014). One should note that in this new updated manual from AASM (2014) the sub-types of insomnia (e.g., psychophysiological insomnia) are only clinically classifiable, not presenting specific diagnostic criteria.

**Table 1. Diagnostic criteria for insomnia disorder (DSM-5)**

<b>DIAGNOSTIC CRITERIA FOR INSOMNIA DISORDER [780.52]</b>
(A) A predominant complaint of dissatisfaction with sleep quantity or quality, associated with one (or more) of the following symptoms: <ol style="list-style-type: none"> <li>1. Difficulty initiating sleep. (In children, this may manifest as difficulty initiating sleep without caregiver intervention.)</li> <li>2. Difficulty maintaining sleep, characterized by frequent awakenings or problems returning to sleep after awakenings. (In children, this may manifest as difficulty returning to sleep without caregiver intervention.)</li> <li>3. Early-morning awakening with inability to return to sleep.</li> </ol>
(B) The sleep disturbance causes clinically significant distress or impairment in social, occupational, educational, academic, behavioral, or other important areas of functioning:
(C) The sleep difficulty occurs at least 3 nights per week.
(D) The sleep difficulty is present for at least 3 months.

**Table 1. (Continued)**

<p>(E) The sleep difficulty occurs despite adequate opportunity for sleep.</p> <p>(F) The insomnia is not better explained by and does not occur exclusively during the course of another sleep-wake disorder (e.g., narcolepsy, a breathing-related sleep disorder, a circadian rhythm sleep-wake disorder, a parasomnia).</p> <p>(G) The insomnia is not attributable to the physiological effects of a substance (e.g., a drug of abuse, a medication).</p> <p>(H) Coexisting mental disorders and medical conditions do not adequately explain the predominant complaint of insomnia.</p> <p>Specify if:  <b>With non-sleep disorder comorbidity</b>, including substance use disorders  <b>With other medical comorbidity</b>  <b>With other sleep disorder</b></p> <p>Specify if:  <b>Episodic:</b> Symptoms last at least 1 month but less than 3 months.  <b>Persistent:</b> Symptoms last 3 months or longer.  <b>Recurrent:</b> Two (or more) episodes within the space of 1 year.</p> <p><b>Note:</b> Acute and short-term insomnia (i.e., symptoms lasting less than 3 months but otherwise meeting all criteria with regard to frequency, intensity, distress, and/or impairment) should be coded as another specified insomnia disorder.</p>
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**Table 2. Diagnostic criteria for psychophysiological insomnia (ICSD-2)**

<b>ICSD-2 INSOMNIA DIAGNOSTIC CRITERIA</b>
<p>(A) The patient's insomnia symptoms meet the criteria for insomnia*.</p> <p>(B) The insomnia is present at least one month.</p> <p>(C) The patient has evidence of conditioned sleep difficulty and/or heightened arousal in bed as indicated by one or more of the following:</p> <ul style="list-style-type: none"> <li>a. excessive focus on and heightened anxiety about sleep;</li> <li>b. difficulty falling asleep in bed at the desired bedtime or during planned naps, but no difficulty in falling asleep during other monotonous activities when not intending to sleep;</li> </ul>

<p>c. ability to sleep better away from home than at home;  d. mental arousal in bed characterized by either intrusive thoughts or a perceived inability to volitionally ceases sleep-preventing mental activity;  e. heightened somatic tension in bed reflected by a perceived inability to relax the body sufficiently to allow the onset of sleep.</p> <p>(D) The sleep disturbance is not better explained by another sleep disorder, mental disorder, medication use, or substance abuse disorder.</p>
<p><b>* General criteria for insomnia</b></p> <p>(A) A complaint of difficulty initiating sleep, difficulty maintaining sleep, or waking up too early, or sleep that is chronically nonrestorative or poor in quality.</p> <p>(B) The above sleep difficulty occurs despite adequate opportunity and circumstances for sleep.</p> <p>(C) At least one of the following forms of daytime impairment related to the nighttime difficulty is reported by the patient:</p> <ul style="list-style-type: none"> <li>a. fatigue;</li> <li>b. attention, concentration; memory impairment;</li> <li>c. social or vocational dysfunction or poor school performance;</li> <li>d. mood disturbance or irritability;</li> <li>e. daytime sleepiness;</li> <li>f. motivation, energy, or initiative reduction;</li> <li>g. proneness for errors or accidents at work or while driving;</li> <li>h. tension, headaches, or gastrointestinal symptoms in response to sleep loss.</li> <li>i. concerns or worries about sleep.</li> </ul>

**Table 3. Diagnostic criteria for chronic insomnia disorder (ICSD-3)**

<b>ICSD-3 INSOMNIA DIAGNOSTIC CRITERIA</b>
<p><b>A.</b> The patient reports, or patient’s caregiver observes one or more of the following:</p> <ul style="list-style-type: none"> <li>1. Difficulty initiating sleep</li> <li>2. Difficulty maintaining sleep</li> <li>3. Waking up earlier than desired</li> <li>4. Resistance to going to bed on appropriate schedule</li> <li>5. Difficulty sleeping without parent or caregiver</li> </ul>

**Table 3. (Continued)**

**B.** One or more of the following related to the nighttime sleep difficulty:

1. Fatigue/malaise
2. Attention, concentration, or memory impairment
3. Impaired social, familial, occupational, or academic performance
4. Mood disturbance/irritability
5. Daytime sleepiness
6. Behavioral problems  
(e.g., hyperactivity, impulsivity, aggression)
7. Reduced motivation / energy / initiative
8. Proneness for errors / accidents
9. Concerns about or dissatisfaction with sleep

**C.** The reported sleep/wake complaints cannot be explained purely by inadequate opportunity (i.e., enough time allotted for sleep) or inadequate circumstances (i.e., the environment is safe, dark, quiet, and comfortable) for sleep

**D.** The sleep disturbance and associated symptoms occur at least three times per week.

**E.** The sleep disturbance and associated daytime symptoms have been present for at least three months.

**F.** The sleep/wake difficulty is not better explained by another sleep disorder

Clinical subtypes:

- Psychophysiological insomnia
- Idiopathic Insomnia
- Paradoxical insomnia
- Inadequate sleep hygiene
- Behavioral insomnia of childhood
- Insomnia due to (another) mental disorder
- Insomnia due to (a) medical condition
- Insomnia due to drug or substance

One must note that a few decades ago some authors as Patricia Lacks established other additional criteria to operationalize ID, namely: sleep onset >30 minutes; total sleep time awake >30 minutes; a maximum of 6,5 hrs of total sleep per night, diurnal fatigue with mood oscillations, and deficits in work performance during at least 3 night per week (Silva, 1990). By definition,

insomnia is associated with sleep efficiency inferior to 85%<sup>2</sup>. However, one must note that this is a guide, not necessarily a defining quality that must be used.

A useful distinction one can draw in ID is concerning the temporal course, contributing to distinguishing insomnia subtypes (Perlis et al., 2011). Initial insomnia concerns to the difficulties in initiating sleep being associated with anxiety and tension states; intermediary insomnia regards to frequent awakenings during the course of the night being implicated in several psychiatric, neurologic, and other medical conditions in general; finally, terminal insomnia concerns to early-awakening and experiencing difficulties to falling asleep again. The latter relates mostly with depressive disorders (Paiva & Penzel, 2011). It can also be distinguished mixed insomnia, which pertains to the combinations of the aforementioned subtypes. ID may be also differentiated regarding duration and severity. In terms of duration, the most common division is between acute and chronic insomnia. In general, acute insomnia does not last more than a month and is intrinsically related to a well-defined precipitant such as a stress situation, substance use, or experiencing acute pain. When this period is exceeded, the insomnia becomes chronic and points to a prototypical case of ID. Perlis, Benson-Jungquist, Smith, and Posner (2005) suggest a germane “rule of thumb” useful to clinical practice: they refer that when the patients stop to relate their complaints with the originating precipitants, and indicate that insomnia seems to have “a life on its own,” it is adequate to consider a case of ID. In terms of severity, it is frequent to distinguish light, moderate, and severe insomnia.

Insomnia diagnosis is actually based mainly on the criteria from *International Classification of Sleep Disorders* (2.<sup>a</sup> ed.) of *American Academy of Sleep Medicine* (ICSD-2, AASM, 2005) (cf. Table 3). Regardless from the preferred classification criteria, there is a significant group of insomnia patients which do not fit into them. Thus, there is necessity of improving the criteria and privilege more dimensional classifications, rather than categorical ones (Ohayon & Reynolds III, 2009).

In terms of prevalence, it is well documented that ID increases with age, being more frequent in women, divorced and widowed individuals, and people with low economical and educational levels. It is a disorder that begins approximately at the adulthood affecting about  $\frac{1}{3}$  of the population (Morgenthaler et al., 2006). The AASM (2005) points that it is a rare disorder

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<sup>2</sup> The sleep efficiency is a well-known measure used in sleep clinics and research. It refers to the quotient between the total sleep time (i.e., time that the individual effectively sleeps) and the total time spent in bed multiplied by 100 (Paiva & Penzel, 2011).

in children, however, more common in teenagers, young-adults and adults from all the ages. Only 13% of the individuals who have complaints of insomnia seek clinical help, although this percentage tends to increase with age and insomnia severity (Buysse, 2011; Morin, 2011).

From the familial incidence point of view, we refer one of the main researches where it was studied a group of 285 patients comprising several types of insomnia, albeit the ID was the most frequent one (Bastien & Morin, 2000). The main findings suggested that 35% of the insomnia patients evidenced a positive familiar history of sleep disturbances, being ID the most prevalent one (75%). Besides, the mother was the principal signalized person (Bastien & Morin, 2000). This finding was also observed in a study by Dauvilliers et al. (2005). The authors argued that despite ID having a multifactorial genesis, the presence of a positive familiar history of sleep disturbances/insomnia cannot at the current moment reveal whether this is due to a genetic predisposition or a social learning mechanism. In the same line, in a study with teenagers and their caregivers, it was observed that insomnia seems to have a hereditary basis, apart from (caregiver) modelling (Wing et al., 2012).

In general clinical practice (as in sleep medicine practice) the comorbidity scenario is the rule. That is, the co-occurrence of distinct disorders in the same individual which consequently complicates the clinical management of the disorder(s)<sup>3</sup>. In ID scope, this is the more common scenario as well. The comorbid complaints which are most salient in insomnia patients are depressive major disorder and anxiety disorders such as generalized anxiety disorder, panic disorder, and posttraumatic stress disorder. Insomnia patients are three times most likely to develop psychological disorders than individuals without sleep disturbances history. On the other hand, some psychological disorders such as depression or anxiety disorders are associated also with the development of insomnia disturbance (Krystal, 2006). ID may co-occur also with other medical conditions (e.g., chronic pain, fibromyalgia) or other sleep disorders (e.g., restless legs syndrome, sleep apnea). Although the frequent comorbidity, it is important to highlight as referred by Roth, Rohers, and Pies (2007) that “insomnia is not merely a symptom of another disorder but a disorder of hyperarousal. Hence, treatment should be directed at the insomnia as well as the comorbid disorder” (p.77). Of the same opinion is Allison Harvey (2006) when she mentions that comorbid insomnia should not be considered as an

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<sup>3</sup> Since 2005, the designation “secondary insomnia” was replaced by the term “comorbid insomnia” (National Institute of Health [NIH], 2005). This demands that the clinical strategies are used taking into account the other problems that patients present – transdiagnostic utility (Cogle, 2012; Harvey, 2006).

epiphenomenon of other clinical conditions, as insomnia tends to remain when the other “primary” disorder is successfully treated.

In summary, ID is characterized as a sleep disorder which demands specific and idiosyncratic assessment and intervention techniques.

### **1.1. Consequences of Insomnia**

As already mentioned, poor sleep nights will influence the daytime period of the individuals. Therefore, it is comprehensible that insomnia impairs different life domains.

In terms of emotional behavior it is protruding the decreasing of self-esteem and self-efficacy levels leading to a sense of lack of control over the self and the own life. Allied to this aspect is the experience of not being understood by other people, frequently causing frustration, anxiety, anger, and even interpersonal and marital problems (Rogojanski, Carney, & Monson, 2013).

In the cognitive domain, there is evidence which supports the decreasing of attention, vigilance, memory, ability to perform calculations, increasing of reaction times with repercussions in diurnal functioning. There is also evidence suggesting that the fatigue appears to be more dysfunctional than diurnal sleepiness according to self-report measures (Shekleton, Rogers, & Rajaratnam, 2010).

Additionally, there is also economical costs associated with ID as performance is not maximized leading to higher rates of absenteeism and hospital visits. These patients are more prone to use maladaptive coping strategies to deal with insomnia (e.g., drinking alcohol beverages, consuming medical or non-medical drugs abusively) (Paiva & Penzel, 2011).

Sleep deprivation, either partial or total, increase the likelihood of having traffic and work accidents, comparatively to good sleepers (Chuah & Chee, 2008).

Finally, we highlight a particular point concerning the self-report quality of life of insomniac patients. There is compelling evidence showing that quality of life of these patients tends to decrease (LeBlanc et al., 2007; Kyle, Morgan & Espie, 2010; Wilson et al., 2010; Specchio et al., 2004). However, when the ID patients are treated (medical or psychological treatments) the quality of life tends to improve along with insomnia symptoms per se. These effects are experienced subjectively as improvements by the patients (Kyle, Morgan, & Espie, 2010; Léger, Scheuermaier, Philip, Paillard, & Guilleminault, 2001).

## 1.2. Insomnia in the Scope of Sleep Disorders

We already have mentioned that ID is the more common sleep disorder making 12.5% to 15% of the total insomnia complaints (DSM-5, APA, 2013; Cervena et al., 2004). In the DSM-5 the insomnia disorder is integrated within the sleep-wake disorders; in the ICD-10, the insomnia diagnosis is possible in the sleep disorders chapter. According to our point of view the best medical classification, and the most used for insomnia (Arnedt, Conroy, Posner, & Aloia, 2006) is the one by *International Classification of Sleep Disorders of American Academy of Sleep Medicine (ICSD-2, AASM, 2005)*<sup>4</sup>. In this classification, unlike the other manuals, insomnia encompasses a whole chapter with eleven possible insomnia diagnostics.

Accordingly, there are listed adjustment insomnia, psychophysiological insomnia, paradoxical insomnia, idiopathic insomnia, insomnia due to mental disorder, inadequate sleep hygiene, behavioral insomnia of childhood, insomnia due to drug or substance, insomnia due to medical condition, insomnia not due to substance or known physiological condition, and physiological insomnia.

## 2. ASSESSMENT OF INSOMNIA: METHODS AND INSTRUMENTS

In sleep medicine there are a variety of indicators that the clinician can obtain from the patients. Conventionally, there is a distinction between subjective measures and objective measures. Within subjective measures there are clinical interviews, sleep diaries and self-report questionnaires; within objective measures there are polysomnography (PSG) and actigraphy; moreover, the measures may be short- and long-term (Azevedo, 1980, 1988; Gomes, 2005). All of these methodologies can be used for insomnia assessment and treatment purposes.

In short, we highlight that in 2006 a group of sleep experts published an article comprising a set of recommendations for assessment in insomnia disorder (Buysse, Ancoli-Israel, Edinger, Lichstein, & Morin, 2006). Additionally, in the sleep medicine field, some authors have differentiated the

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<sup>4</sup> The diagnostic classifications of DSM-IV-TR and CID-10 are more used in primary health and psychiatric settings, whereas ICSD-2 is more used in sleep medicine centers (Arnedt, Conroy, Posner, & Aloia, 2006).

“hard” measures – objective, from the “soft” ones - subjective (Moul, Morin, Buysse, Reynolds III, & Kupfer, 2007).

## 2.1. Subjective Measures

Subjective measures encompass self-report clinical interviews, questionnaires (for collecting data in the short-term) and sleep diaries (for collecting data in the long-term).

Clinical interviews are the gold standard in insomnia’s assessment. The Insomnia Interview Schedule (Morin, 1993) is one of the most well-known clinical interviews (Arnedt, Conroy, Posner, & Aloia, 2006). General assessment of sleep includes the following topics: (1) definition of the sleep problem, (2) duration, (3) severity, (4) sleep patterns, (5) efficacy of the previous treatments and (6) worries and expectations of the patient regarding treatment. The standard cognitive-behavioral clinical guide is a useful script which supports the entire assessment and intervention both within the scope of sleep disorders and other disorders (Dudley & Kuyken, 2006). Self-report questionnaires are an important complementary source of information in insomnia’s assessment. They can be administered to large groups of individuals and enable to interpret the individual scores of the patient (Spielman, Yang, Glovinsky, 2011). Some of the most used and well-known scales in this domain are the Insomnia Severity Index [ISI] (Morin, 1993; Bastien, Vallières, & Morin, 2001), the Dysfunctional Beliefs and Attitudes about Sleep [DBAS-16] (Morin, Vallières & Ivers, 2007), the Pre-Sleep Arousal Scale [PSAS] (Nicassio, Mendlowitz, Fussell, & Petras, 1985), the Glasgow Content of Thoughts Inventory [GCTI] (Harvey & Espie, 2004), the Glasgow Sleep Effort Scale [GSES] (Broomfield & Espie, 2005), the Athens Insomnia Scale (Soldatos, Dikeos, & Paparrigopoulos, 2000), the Brief Insomnia Questionnaire (Kessler et al., 2010), and the Ford Insomnia Response to Stress Test [FIRST] (Drake, Richardson, Rohers, Scofield, & Roth, 2004).

Sleep diaries are a self-report measure completed normally during 1 or 2 weeks. Through them, it can be computed sleep onset latency, wake after sleep onset, total sleep time, total sleep time spent in bed, and sleep efficiency indices (Arnedt, Conroy, Posner & Aloia, 2006; Morin & Espie, 2003). There are different versions of sleep diaries, see for example Morin (1993) or Morin and Espie (2003). Recently, it was defined a “standard form” of sleep diary (Carney et al., 2012). To note, there are some drawbacks related with sleep diaries: they require the collaboration of the individual; they are a retrospective tool and thus

sensitive to memory distortions; they demand considerable time to be filled in; and they require manual calculations from the clinician / researcher.

## 2.2. Objective Measures

The objective measures comprise PSG (for collecting data in the short-term) and actigraphy (for collecting data in the long-term).

The PSG represents the “gold standard” of sleep behavior assessment. It permits the conjunction of several physiological indicators such as electroencephalography (EEG), electromyography (EMG), electrocardiogram (EKG), electro-oculogram (EOG), and measures of oxygen saturations enabling an overall evaluation of an individual with some sleep disorder. For a basic PSG study, it is needed at least an EEG, an EOG, and an EMG measures. In some sleep disorders such as sleep apnea, this evaluation is essential. However, in ID, this is a dispensable exam, albeit it may be useful for the screening of other sleep disorders (i.e., differential diagnosis), and of course, for scientific research purposes (Parrino et al., 2004). Nonetheless, there are authors who pinpoint that a routine PSG should be carried out even in insomnia cases (Buysse et al., 2006; Paiva & Penzel, 2011).

Actigraphy consists in wearing an object similar to a wrist clock or to an arm-band containing an accelerometer which enables to study the rest-activity pattern over a week or two (it enables registering more time, but usually this is the time-span most studied). After this, the data can be downloaded to a computer and several sleep parameters can be calculated (Carvalho, 2002). Notwithstanding, the actigraphy is not a mandatory instrument in insomnia as we aforementioned. Even so, several clinicians find its use germane in treatment, namely when they are using cognitive restructuring-based techniques (Tang & Harvey, 2004). In terms of research settings it became an important tool to study sleep objective parameters in ecological contexts (Afonso, 2012; Littner et al., 2003).

Recently, some investigators are trying to define criteria to study ID recurring to actigraphy. Preliminary findings suggest an agreement rate between PSG and actigraphy pertaining to total sleep time, sleep onset, and number of nocturnal awakenings > 5 minutes indicators (Lichstein et al., 2006; Natale, Plazzi, & Martoni, 2009; Vallières & Morin, 2003). Therefore, actigraphy is a nonintrusive and comfortable tool (Ancoli-Israel et al., 2003). In cases where the PSG is not available, actigraphy seems to be a good alternative (Edinger & Carney, 2008).

In sum, it should be noted that according to evidence-based guidelines from the American Academy of Sleep Medicine (AASM), insomnia is primarily diagnosed by clinical evaluation considering a thorough sleep history and detailed medical, substance and psychiatric history, as a standard which reflects high degree of clinical certainty (cf. e.g., Schutte-Rodin et al., 2008). Moreover, according to the same academy, “polysomnography and daytime multiple sleep latency testing (MSLT) are not indicated in the routine evaluation of chronic insomnia, including insomnia due to psychiatric or neuropsychiatric disorders” (Schutte-Rodin et al., 2008, p. 487).

### 3. PSYCHOLOGICAL TREATMENT OF INSOMNIA

Psychological treatments of insomnia are one of the most important aspects of insomnia management. **CBT-I** (cognitive-behavioral therapy for insomnia) is actually the “working horse” of the psychological treatments for insomnia (Wilson et al., 2010). The research supports its efficacy and effectiveness, short- and long-term, in surpassing the limited effects of medication which recommendation is limited (4-8 weeks) (Morin, 2002; Morin & Benca, 2012; Sivertsen, 2006). The increasing interest in insomnia’s psychological treatment outcomes derives from the dissatisfaction with the psychotropic drugs and the fact that insomnia is the second most prevalent mental health problem (Harvey & Tang, 2006). Within the evidence-based set of techniques, the research has shown that there are some of them more effective than others (Verbeek, Schreuder, & Declerck, 1999). Even so, there are studies suggesting that about  $\frac{1}{3}$  of the patients are medicated when they start CBT-I.

In 1988, in a famous conference in Stanford, it was concluded that 3 in 4 insomnia patients could improve with CBT-I. Actually, about 70-80% of insomnia patients benefit from CBT-I (Morin, 2002). Moreover, this particular form of treatment seems to be more useful and beneficial than the psychopharmacological one, according to patients’ perspective (Morin et al., 1992, Clemente, Ferreira, Fernandes, César, & Azevedo, 1996, Haynes & Bootzin, 2010). Despite the good results, Harvey and Tang (2003) argue that CBT-I’s efficacy is lower compared to CBT for other psychological disorders such as depression or anxiety.

Non-pharmacological or psychosocial treatments for insomnia emerged in the 30s of the last century coinciding with the application of relaxation training. Since 1970 there has been a revolution in the psychological treatment of various psychopathologies and from then on, this is also reflected in the field of

insomnia resulting in a set of clinical procedures such as stimulus control therapy or cognitive therapies (Perlis et al, 2011; Riemann et al., 2009, 2010.). Thus, it was found a viable alternative to the traditional insomnia's symptomatic approach (i.e., with unique and privileged use of hypnotic drugs) and exclusively oriented for psychological disorders treatment (Clemente, 2006; Pigeon, 2010; Morin & Peek, 2003).

The first psychological interventions for insomnia were based on two assumptions: (1) insomnia may be conceptualized as a "learning disorder" and consequently is governed by principles of learning theories or laws, and (2) the patients may learn to cope with insomnia applying the strategies derived from those theories and models (Silva, 1990).

Blind placebo-controlled randomized clinical trials have suggested that, on average, cognitive-behavioral interventions demonstrate efficacy within six weeks of treatment and follow-up measures, for example, six months after CBT-I (Edinger, Wohlgenuth, Radtke, Marsh, & Quillian, 2001; Morin et al, 2009). Although in the current work our interest lies within the adult population, it is important to note that in pediatric clinical practice CBT has shown effectiveness, and is also recommended as a first-line treatment for behavioral insomnia of childhood (i.e., pediatric behavioral insomnia or childhood behavioral insomnia) (Owens, 2006; Owens, France, & Wiggs, 1999). CBT-I with older adults has also shown empirical evidence of efficacy (Fiorentino & Martin, 2010; Morgenthaler et al., 2006).

Another point that deserves attention is the issue of combined treatments, i.e., the junction in the same therapeutic plan of psychopharmacological and psychotherapeutic strategies. Although it may be intuitive to think that the combination of both treatments may enhance therapeutic outcomes, it is certain that there is no secure and robust evidence that such possibility is the better one (Morin, 2006b). Some studies suggest that in insomnia the psychological interventions alone tend to be more effective than when combined with pharmacological therapy (Lichstein, Turcotte, & St-Jean, 2012). There are no criteria, for example, on the dosage of the drug and treatment duration. Morin (2006a) identifies three essential key points that clinicians should bear in mind when considering combination of treatments: (1) there is no single treatment that is effective per se for all the patients with insomnia; (2) the preference for a specific treatment - a patient who describe her/his insomnia as a disease/medical condition is more likely to adhere to a psychopharmacological treatment, whereas another patient who describes its complaints in a psychological frame might adhere better to a psychosocial treatment; and (3) the patient may not be motivated to follow behavioral prescriptions.

Complementing this scenario is the fact that approximately 60% of people who suffer from insomnia do not mention this difficulty to her/his doctor, particularly in the primary health care context (Cortoo, Verstraeten, & Cluydts, 2006). There is no doubt that there are effective and efficient treatments for insomnia. However, there remain some difficulties in accessing and implementation of appropriate treatments, namely: (1) lack of training of doctors and clinical psychologists in management of sleep disorders, particularly insomnia, (2) the lack of time in medical and psychological consultations to work out issues pertaining to sleep, (3) the disregard for sleep complaints of the patients, (4) the belief among technicians and patients that sleep complaints are not important, (5) the perception that available treatments are ineffective and are associated with several risks, and (6) the belief that there is no evidence that the resolution of the sleep problems lead to an improvement of comorbid medical conditions and quality of life in general (Benca, 2005; Edinger & Wohlge-muth, 1999).

Next, we will briefly describe the main cognitive and behavioral techniques that have been used for insomnia treatment.

### **3.1. Techniques and Behavioral and Cognitive Therapies for Insomnia**

#### ***3.1.1. Stimulus Control***

The stimulus control technique encompasses a set of instructions that are provided to the patient in order to re-associate stimuli like bed or bedroom with sleep itself. This technique involves five basic requirements: (1) going to bed only when the patient feels drowsiness; (2) getting out of bed if he/she does not fall asleep within 10 minutes (Harvey & Tang, 2006) or 20 minutes (Morin et al., 2006), going to another room, occupying him/herself with a monotonous activity and only return to bed when he/she feels sleepy again; and (3) using the bed / bedroom only for sleep or sexual activity (e.g., it were not allowed reading activities, eating or watching television in the bedroom). Together with these indications - which define the stimulus control technique - the following recommendations are also provided: (4) waking-up in the morning, about the same time regardless of the amount of sleep (duration) obtained in the previous night, and (5) avoiding taking naps during the day or during wakefulness. The rationale behind this procedure is that there is a negative or maladaptive conditioning between sleep-related behaviors and sleep-incompatible behaviors. Therapists should be especially cautious when prescribing this procedure to older adults, especially because it can involve getting out of bed

and as such do increase the likelihood of falls, especially when they are medicated, which is the most common situation (Morin 2011).

### **3.1.2. Time in Bed Restriction**

Sleep restriction technique (or restriction of time in bed) is aimed to reduce the time spent in bed in order to adapt it to the current (average) amount of time the patient spends objectively sleeping plus 30 additional minutes; this 30 minutes period encompasses the time associated with normal sleep onset latency and eventual nocturnal awakenings of the “good sleeper” (Troxel et al., 2012).. The central point is to maximize sleep efficiency and the association “bed→sleep.” One should note, however, that the minimum number of hours “prescribed” for the patient to remain in bed should not be less than 6 hours (Troxel et al. 2012). This step is important because patients spend many hours a day in bed trying to fall asleep, and the actual hours of sleep are less, so there is a significant lag. In terms of method, the following steps are generally followed: (1) the patient is instructed to fill in the sleep diaries for 2 weeks to get the average duration of slept hours per night (e.g., 05h:45m)<sup>5</sup> - this will be the “sleep window”; (2) then, the clinician in collaboration with the patient settle a “rising time” which should be strictly followed each morning (e.g., 7:00); the “threshold time” is then calculated by subtracting the average sleep effective duration from the combined “rising time” (e.g., 7:00 - 5:45 = 1:15 → “threshold time”). The patient is instructed not to go to bed before this “time limit” (i.e., 1:15 am) and get up in the next morning at the previously scheduled time. Individuals should follow this prescription every night including at weekends. Weekly, there are made some adjustments to the “sleep window,” which are based on the sleep efficiency indices. If the sleep efficiency is equal or greater than 90%, the clinician should increase the “sleep window” in 15 minutes; if the sleep efficiency is lower than 85%, the clinician should decrease the “sleep window” in 15 minutes (Espie & Kyle, 2012).

Sleep restriction in bed is a technical procedure that can create some resistance on the part of some patients as it produces a moderate sleep deprivation, which contributes therapeutically to the increase in sleep pressure and to adjust homeostasis and the circadian sleep-wake cycle. As main contraindications are the use in individuals suggestible to seizures, bipolar patients and patients with some types of parasomnias (Morin, 2011). Other authors point to other contraindications such as the presence of mood disorders, sleep apnea, delayed sleep phase and shift work (Glovinsky & Spielman, 1991).

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<sup>5</sup> The calculations are always rounded at intervals of 15 minutes.

A recent exploratory study comparing the efficacy of sleep restriction against the stimulus control strategy indicated that although the two techniques have been somewhat different, in general, there was a slight superiority of sleep restriction pertaining to improvements in sleep latency, sleep efficiency, and self-reported severity of insomnia (Armstrong, Sidani, & Bootzin, 2013).

### ***3.1.3. Relaxation Training***

The relaxation training encompasses a variety of procedures aimed at reducing tension or somatic anxiety and / or cognitive or psychophysiological arousal before sleep or after awakenings after sleep onset (Bonnet, 1997; Harvey & Tang, 2006; Vaz-Serra, 2002). This family of strategies includes progressive muscle relaxation, autogenic training, yoga, hypnosis, and biofeedback<sup>6</sup>. The patients learn to control functions related to the autonomic nervous system linked to prototypical activation of insomnia, for example. Although there are many relaxation procedures such as Schultz autogenic training, the most studied method in the field of insomnia is the progressive muscle relaxation (i.e., Jacobson Relaxation Training). One must note, however, that at least initially, it is a procedure susceptible of increasing the levels of anxiety of individuals with perfectionist personality traits (Morin, 2011).

### ***3.1.4. Cognitive Therapy***

Cognitive therapy refers to a psychological or psychotherapeutic method intended to identify, challenge and modify dysfunctional beliefs and attitudes (in the case of insomnia, deeply related to the sleep behavior). There are no available current data to justify its use as a single treatment for insomnia (Morgenthaler et al., 2006). However, recent studies have suggested that both behavior and cognitive therapy have shown efficacy when evaluated in an independent manner (Morin, Harvey & Bélanger, 2011). In this line, some authors have posited that cognitive restructuring is inherent to the implementation of behavioral-based techniques (Cougler, 2012); they are closely related to the method of cognitive restructuring. This perspective assumes that individuals are not disturbed by the events themselves, but by their personal vision or perception about these. In other words, the cognitive model is based on the idea that they are not the stimuli or situations themselves that disturb the individuals, but rather the view that people have on these (Beck, 1976, Beck &

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<sup>6</sup> This procedure has been subject to some studies indicating that may be an effective strategy for insomnia – guideline; put simply, it is a strategy derived from the psychophysiology and which enable individuals the opportunity to receive and process retroactive information (feedback) about their bio-physiological functions (bio) through visual or auditory stimuli.

Emery, 1985). Basically, cognitive therapy for insomnia problems relates to the identification, evaluation and modification of cognitions related to fear of not being able to fall asleep / or daytime consequences derived from sleepless nights (Carney et al., 2010; Turcotte, St-Jean, & Bastien, 2011). As empirical tests or behavioral experiences associated with them often involve short-term sleep deprivation, it is a procedure that is contraindicated for patients with certain professions such as industrial machines operators or airline pilots. Although there is no sufficient evidence as monotherapy for insomnia, there is evidence suggesting that there is an improvement in the effectiveness of psychological treatment for insomnia whether cognitive components are included or not (Harvey & Eidelman, 2011). One of the most useful strategies embedded in the cognitive restructuring method is the self-monitoring recordings; these are sheets divided into several columns and containing topics such as day / situation, negative automatic thoughts, emotions and consequent intensity, alternative thoughts and intensity evaluation emotions after the generation or development of alternative cognitions (Beck, 1995; Morin & Bélanger 2011; Perlis & Gehrman, 2011).

In sum, cognitive therapies rely heavily on the cognitive restructuring paradigm, including, in a simplified manner, the identification of dysfunctional automatic thoughts, the classification of these cognitions in terms of information processing errors (i.e., cognitive distortions) and the challenging of cognitions and beliefs (Beck, 1995). The initial application of cognitive restructuring methods to insomnia was initially suggested by Morin (1993). As previously mentioned (cf. 2.1. subjective measures) there is a well-known questionnaire used in both clinical and research settings, aimed to identifying dysfunctional beliefs about sleep and insomnia (Morin, 1993; Morin et al., 2007).

Within the recommendations of international associations of sleep medicine it is common to include two specific cognitive techniques that can be used, though directed to very particular cases: “stop thinking” (i.e., the patient identifies dysfunctional cognitions and contingently should exclaim “STOP!” in order to break the chain of thoughts and cease the ruminative activity) and “paradoxical intention” (i.e., a technique that aims to reduce the anxiety associated with sleep effort at bedtime through the instruction to go to bed and try to not fall asleep – guideline). This latter strategy has the disadvantage of being specific only for sleep onset problems (Espie & Kyle, 2012). In addition to these two strategies there is the “cognitive control” technique. It is an extension of stimulus control therapy, but more focused on cognitive content, with the goal of decreasing the probability of having activating mental activity in the usual sleeping environment of the patient. The instructions consist of: (1)

providing 20 minutes every day for this activity using a notepad and a pen; (2) discussing the day's events as well as plans for the next days; (3) listing the disturbing cognitions and problems and outline possible solutions to each one; (4) these 20 minutes will help to organize activating cognitions of the patient, decreasing their intensity; (5) if the patient is already in bed trying to fall asleep and these activating thoughts occur, the patient should remember that he/she already "dealt with the issue" and (6) if new images or thoughts that prevent him/her from falling asleep appears, the person should register these new cognitions in the paper kept at the bedside table) (Espie & Lindsey, 1987).

One other technique that might be useful in insomnia is based on "opening-up" strategy by Pennebaker. In this technique patients have to write strong emotional situations that prevent the process of falling asleep. This exercise should last for 3-5 days at least. Individuals should be honest and explore thoughts and emotions that are being stressful at the present time (not only in relation to complaints of insomnia). This is a strategy aimed to help reorganize cognitive dysfunctional processes with a strong emotional charge in a cathartic way. It is expected that the intensity and frequency of cognitive activity before sleep decrease (Harvey & Farrell, 2003).

Finally, Levey, Aldaz, Watts and Coyle (1991) suggest a strategy derived from the classical works within cognitive psychology of memory by Alan Baddeley. Based on the idea that working memory (sometimes called short-term memory) has a temporary and limited capacity storage, the authors point out that if one takes the short-term system with meaningless phonemes, the projection of activating and dysfunctional cognitions loses intensity. This technique was known as "articulatory suppression" and is based on the following instructions: (1) the patient should lie in bed and close his/her eyes; (2) repeat a meaningless word every 1-2 seconds (e.g., "the"); (3) whisper or utter the selected word; and (4) remain in this task for 5 minutes or until he/she feels drowsy (Morin & Espie, 2003).

It is worth mention one of the latest developments regarding cognitive techniques for insomnia: the cognitive refocusing treatment (Gellis, 2012). In summary, this strategy is brief (can be discussed only in a single session). The patient, with the help of clinician, should identify three different categories of thoughts (contents) strong enough to hold the attention of the patient at bedtime. These categories must comply with two features: the thoughts should be non-emotional and non-physiological activators and should be catchy enough to keep the attention of the patient. For example, one can think about new recipes or an excerpt from a favorite TV program. Following this, the patient is instructed to focus attention on these stipulated thoughts at bedtime or when

experiencing nighttime awakenings. If other thoughts arise (i.e., intrusive thoughts), individuals are instructed not to attach particular importance and focus attention to the fixed cognitive contents previously listed. The ultimate goal of the strategy is to encourage the learning of the association between a specific category of thought and sleep behavior. In preliminary studies, the duration considered for the use of this procedure is around 30 minutes (Gellis, Arigo, & Elliot, 2013).

### **3.1.5. Sleep Education / Sleep Hygiene**

Sleep education/sleep hygiene though being presented as the last strategy in this list, is usually the first step in intervention in insomnia and, in general, in all disorders related to sleep behavior. Briefly, this strategy comprises a set of guidelines on aspects related with sleep (e.g., sleep architecture, changes in sleep patterns associated with development, etc) and general health practices that may interfere with sleep. Psychoeducation or education about the rules of sleep hygiene as well as the explanation of basic concepts about sleep characteristics are a non-specific ingredient of the therapeutic plan, as it should be a common and widespread practice in psychotherapy sessions but also in medical consultations. On the other hand, there are studies that refer that psychoeducation may be necessary but not sufficient *per se* to resolve the most cases of chronic insomnia. However, there are descriptions of some authors who reported that sleep education sessions were sufficient to resolve ID cases classified as moderate (Morin, 2011; Silva, 1990). In the most recently international published recommendations, there are no data to support this strategy as the only “therapy” in insomnia (Morgenthaler, 2006). The requirements related to sleep hygiene frequently consist of: 1 - always wake up at the same time every day in order to adjust the biological clock (it is explained to the patient in a simple manner some notions of applied chronobiology with relevance for her/his particular case); 2 - regular physical exercise, albeit not close to bedtime (e.g., up to 3 hours before) - this regular activity decreases sleep latency and enhances deep sleep; 3 - Check if there are appropriate and facilitating conditions for sleeping, i.e., mattress and pillows quality, checking for noise, exposure to light and, where appropriate, in particular cases, creation of alternatives that do not greatly disturb sleep as in the case of individuals caring for an infant child; 4 - investigate if the bedroom has a proper and comfortable temperature (too hot or cold can hinder the sleep continuity and increase the number of nighttime awakenings); 5 - practice of a regular diet and avoid going to bed with appetite (one should make small but regular meals - when the organism feels appetite the individual's attention tends to focus on the

physiological sensations causing discomfort, and consequently, causing sleep onset difficulties); 6 - Avoid drinking large amounts of liquids late in the day/early evening (the rationale is that if there is less intake of fluids, the kidneys do not produce so much urine, which would fill the bladder and it would indicate to the brain the need to urinate during the night); 7 - avoid using products that contain caffeine, such as coffee, cola soft drinks, chocolate, energy drinks and some types of tea, because caffeine is a stimulant and therefore helps to increase the level of excitability of the nervous system; 8 - Avoid drinking alcohol (it should be explained to the patient that although alcohol facilitates sleep, it will fragment the sleep and will contribute to a poor quality of sleep); 9 - Avoid smoking (as it contains nicotine and it is a stimulant); 10 – Do not “take problems to bed” (while acknowledging that such practice is not easy to perform, the clinician may resort to strategies or exercises applied in other clinical conditions such as generalized anxiety disorder - one of these strategies which is commonly used is the “worries chair”); 11 – Do not force sleep (this requirement reinforces the idea that the more the patient makes efforts to rest or sleep the worst outcome he/she gets contributing to a vicious cycle of performance anxiety); 12 - Put the clock out of sight and not look at it during nocturnal awakenings, as it will signal to the individual the hours that have passed and fuel the worry cascade; 13 - Avoid naps or lying in bed / sofa during the day (in patients with insomnia this is a cardinal rule - do not realize it will create sleep pressure and lead to sleep regulation and homeostatic equilibrium); and 14 - To avoid sleeping with pets (as they often move during the night they may cause sleep interruptions). As can be seen, these requirements related to sleep hygiene have some overlapping with some of the indications accompanying sleep restriction and stimulus control techniques (Morin & Espie, 2003) and as such sometimes it becomes complex the task of distinguishing the different strategies for insomnia. On the other hand, discussion of sleep hygiene habits can be considered as inseparable from cognitive restructuring strategies according to several authors (Perlis et al., 2011; Silva, 1990).

### ***3.1.6. Multi-Modal Cognitive-Behavioral Therapy for Insomnia (CBT-I)***

The CBT sets the more generic term used to encompass the combination of cognitive and behavioral techniques (Morgenthaler et al, 2006; Morin, 1993, 2011; Morin & Benca, 2012). Currently, many authors prefer to use this more comprehensive and integrated modality in their interventions with patients with ID (Morin & Espie, 2003; Perlis et al., 2005). In the words of Espie (2007) CBT “is based on the concept that cognition, emotion and behavior all interact and that maladaptive thoughts can cause negative feelings which can result in

changes in behavior” (p.4). Still, it must be considered that behavioral strategies continue to show up as the most effective (Epstein, Sidani, Bootzin, & Belyea, 2012).

A general strategy related to education and sleep hygiene and following the principles of respondent and operant conditioning is the establishment of “pre-sleep routines,” which implies that the patient sets systematic daily routines (i.e., behavioral repertoires, for example, before going to bed the individual can take a hot bath, brush teeth, going into the WC, watch TV, etc) related with sleep behavior. With consistent training, these associations between pre-sleep routines and subsequent sleep become habits and induce drowsiness (Wickwire, Schumacher, & Clarke, 2009).

Similarly to whatever therapeutic process, insomnia treatment should comprise at least one session devoted to “relapse prevention” and future problems that it can be predicted (Morin & Espie, 2003). In this session, it is usually discussed ways of dealing with lapses and relapses that can occur in the future through “role-playing,” analyzing the cognitive contents and emotional activation that might arise. This is an opportunity to assess and monitor the learning gains and to adjust some technical procedures.

A good practice is to jot down the main points worked in the sessions (Harvey, 2005). After this phase, the patient should be followed in longer intervals in time, following the therapeutic regimen over the long-term (i.e., follow-up).

### ***3.1.7. New Developments in CBT-I***

A more recent development in the psychosocial treatment of insomnia is the application of mindfulness and acceptance-based techniques. These approaches integrate empirically validated procedures derived from behavioral and cognitive therapies albeit having as background the principles of mindfulness strategies. One of the core tenets is that to facilitate sleep it is necessary to experience cognitive deactivation and an attitude of non-judgment and acceptance from one's own mental events, such as negative automatic thoughts (NATs) and mental image.

Quite simply, it can be said that it “should be practiced with an attitude of nonjudgmental acceptance. That is, perceptions, cognitions, emotions or sensations that enter the individual's awareness during mindfulness practice are observed carefully but are not evaluated as good or bad, true or false, healthy or sick, or important or trivial” (Lundh, 2005, p.34). One type of more structured intervention proposes for instance, a short protocol (around 8 weeks) and includes group sessions consisting of 6-8 participants (Ong & Manber, 2011).

This new approach to insomnia aims to change the relationship that individuals have with their own sleep rather than working directly with the explicit modification of the amount of sleep obtained per night (Lundh, 2005; Ong & Scholts, 2010). Although there are few systematic studies on the application of this methodology in the field of insomnia, some studies have pointed to positive results pertaining to patients' satisfaction (Ong & Manber, 2011). A brief intervention (i.e., 3 sessions) based on mindfulness, particularly in acceptance and commitment therapy (ACT), suggests to be of importance in the reduction of symptomatology and improving in self-reported quality of life (Peters, Junge, Cunnington, Ong & Greenwood, 2012). There is already some evidence indicating that the addition of mindfulness strategies in traditional cognitive-behavioral protocols enhances the clinical effectiveness of the interventions (Ong, Shapiro, & Manber, 2008). In line with what is recommended by these new cognitive-behavioral approaches, a strategy that is often used is "thought suppression," initially proposed by Harvard psychologist Daniel Wegner. The classic example of the "white bear exercise" may be considered an important behavioral experiment (Ree & Harvey, 2004). This exercise can be very useful in the very first sessions when discussing with the patient the advantages and disadvantages of "having or not having control over mental processes" (Espie et al., 2006). Put simply, what this psychological theory of Wegner (i.e., Ironic Processes of Mental Control) is suggesting is that the more conscious or voluntary effort an individual makes to avoid thinking about something, the greater the probability of failure in this task (Wegner, Schneider, Carter III, & White, 1987). This process is visible, for example, when individuals attempt not to think on a given stimulus/object. This process increases the probability that the avoided content appears during the dreaming activity of the individual in the same day (Wegner, Wenzlaff, & Kozak, 2004).

### **3.2. Indications, Benefits and Drawbacks**

From the foregoing, it is clear that cognitive and behavioral strategies are effective in management of ID (Morin & Benca, 2012). As main indications for the use of these techniques are cases of primary and comorbid insomnias. In the case of short-term insomnia, there is evidence of effectiveness similar to those achieved with pharmacologic therapies; in the case of chronic insomnia, CBT-I is recommended as first-line treatment (Morgenthaler et al., 2006; Morin & Benca, 2011; Morin & Espie, 2003). After CBT-I, usually there is a number of significant changes, such as a decrease in the dissociation between subjective

and objective measures and an improvement in sleep patterns measured through sleep diaries and actigraphy (Sato, Yamadera, Matsushima, Itoh, & Nakayama, 2010).

It is relevant to note that it is advisable to discontinue the medication before starting CBT-I in order to establish a baseline for the patient (“free of medication”); it also avoids problems associated with discontinuation/withdrawal of the drug after psychological treatment; moreover, concomitant use of hypnotic or other kind of medication may cause biased attributions regarding treatment outcomes by patients (Perlis et al., 2005). It is noteworthy to outline that the medication might difficult the successful implementation of psychological strategies. Some authors suggest that CBT “is most likely to be successful if the medications are discontinued before treatment” (Perlis et al., 2005; p. 45), and this is data supported in empirical evidence (Lichstein et al., 2012). The CBT-I assumes a set of benefits: maintenance of the long-term gains; does not have a negative interaction with other known medical treatment approaches, and it seems to be relatively innocuous in terms of adverse effects. On this last point it should be noted that many authors have already identified some negative effects and treatment failure associated with psychological treatments, including the empirically supported or validated treatments (Barlow, 2010). The disadvantages that may be related to the implementation of CBT in patients with insomnia are mainly its cost (i.e., as other psychological interventions and CBT applied to other disorders, psychosocial treatment requires a greater number of sessions compared with pharmacological interventions); the response latency (i.e., unlike some drugs that have almost an immediate effect, CBT-I usually requires a few weeks in order the patient can experience some beneficial effect); it requires time and motivation (i.e., it requires that patients have time in their schedule to implement the procedures, such as relaxation training and requires that the patient adheres to the treatment protocol and be collaborative); it can create daytime sleepiness during sleep restriction procedure (which therefore may contribute to deviations in implementation of techniques); and difficulties in access to a trained and qualified clinical (i.e., currently, there are still few psychologists, psychiatrists, neurologists and possibly other professionals who have consistent training in the assessment and treatment of insomnia) and, as such, it is not yet a sufficiently widespread and pervasive practice (Morin, 2006a; Moul et al, 2007).

It should also be noted that, despite the results / therapeutic successes with CBT-I, only about 20 to 30% of patients returning to a “normal” sleep pattern,

that is, the sleep pattern that was habitual before the disorder onset (Moul et al., 2007).

As challenges for the future it is pointed out that it is necessary to disseminate this type of intervention in various settings in order to make the practice of CBT-I more known; it is essential to invest in the training of doctors and psychologists at the primary care level (Ellis, 2012). According to Buysse (2011), the biggest challenge for psychological therapies for insomnia is its spread in the scientific community.

## CONCLUSION

ID is a sleep disorder that can be identified through different diagnostic systems. The classification of AASM (2005; 2014) is the one that specifies more dysfunctional behaviors with implications for psychological clinical formulation of the cases. There are several methodologies to assess insomnia, however, the most useful are subjective ones such as the clinical interviews. Besides, there are well-established treatments for ID that should be privileged, particularly psychological therapies.

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## Conflict of Interest

The authors declare no conflict of interest.

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**Gina Caetano** obtained her PhD at the Brain Research Unit of the Helsinki University of Technology, to which followed a postdoctoral period at the same institution. She has worked as a senior postdoctoral fellow at IBILI-University of Coimbra (Portugal), while currently developing further capacities as scientific consultant. Her research interests include application of neuroimaging techniques to basic and clinical neuroscience, having inherently an interdisciplinary profile.

**Miguel Castelo-Branco** obtained his PhD at the Max-Planck Institute for Brain research, Frankfurt, Germany and is now Associate Professor at the University of Coimbra. He has held a Professorship in Psychology in 2000 at the University of Maastricht, the Netherlands. Before, he was a Postdoctoral fellow at the Max-Planck-Institute for Brain Research, Germany where he had also performed his PhD work (1994-1999). MCB has made interdisciplinary contributions in the fields of Cognitive Neuroscience, Human and Animal Neurophysiology, Visual Neuroscience, Human Psychophysics, Functional Brain Imaging and translational research in Neurology. He is the Scientific Coordinator of IBILI, a leading Vision Research Institute in Portugal and is the Scientific Coordinator of the National Functional Brain Imaging Scientific

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