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Delphi consensus recommendations for the management of chronic insomnia in Canada

Charles M. Morin [a,*], Atul Khullar [b], Rebecca Robillard [c], Alex Desautels [d,e], Michael S.B. Mak [f,g], Thien Thanh Dang-Vu [h,i], Walter Chow [j], Jeff Habert [k], Serge Lessard [l], Lemore Alima [m], Najib T. Ayas [n], James MacFarlane [o], Tetyana Kendzerska [p,q], Elliott K. Lee [r], Colleen E. Carney [s]

[a] *École de Psychologie and Centre de recherche CERVO/Brain Research Center, Université Laval, QC, Canada*
[b] *Department of Psychiatry, University of Alberta, AB, Canada*
[c] *School of Psychology, University of Ottawa, ON, Canada*
[d] *Center for Advanced Research in Sleep Medicine, Hôpital du Sacré-Coeur de Montréal, QC, Canada*
[e] *Department of Neurosciences, Université de Montréal, QC, Canada*
[f] *University of Toronto, ON, Canada*
[g] *Centre for Addiction & Mental Health, ON, Canada*
[h] *Department of Health, Kinesiology, and Applied Physiology, Concordia University, QC, Canada*
[i] *Centre de Recherche de l'Institut Universitaire de Gériatrie de Montréal (CRIUGM), QC, Canada*
[j] *Victoria, BC, Canada*
[k] *Department of Family and Community Medicine, University of Toronto, ON, Canada*
[l] *Department of Psychiatry, University of Ottawa, ON, Canada*
[m] *Edmonton, AB, Canada*
[n] *Department of Medicine, University of British Columbia, BC, Canada*
[o] *Department of Psychiatry, University of Toronto, ON, Canada*
[p] *Department of Medicine, University of Ottawa, ON, Canada*
[q] *Ottawa Hospital Research Institute, ON, Canada*
[r] *Sleep Disorders Clinic, Royal Ottawa Mental Health Centre, ON, Canada*
[s] *Department of Psychology, Toronto Metropolitan University, ON, Canada*

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ABSTRACT

Objective: The lack of current Canadian practice guidelines for the management of insomnia poses a challenge for healthcare providers (HCP) in selecting the appropriate treatment options. This study aimed to establish expert consensus recommendations for the management of chronic insomnia in Canada.
Composition of the committee: Sixteen multidisciplinary experts in sleep medicine and insomnia across Canada developed consensus recommendations based on their knowledge of the literature and their practical experience.
Methods: The consensus recommendations were developed through a Delphi method. Consensus was reached if at least 75 % of the voting participants "agreed" or "strongly agreed" with the corresponding statements. The quality of supporting evidence was rated using a GRADE rating system.
Report: Among 37 recommendations that reached consensus for the management of chronic insomnia, the experts recommend and agree that.
Conclusion: These consensus recommendations highlight the need to increase awareness, capacity for, and access to CBT-I; integrate newly approved pharmacotherapy; reduce both self-medication and medications with limited evidence or low risk/benefit ratio.

- Chronic insomnia should be specifically targeted for treatment, even in the presence of comorbidities.
- Cognitive-behavioural therapy for insomnia (CBT-I) is the first-line treatment. Sleep hygiene alone is not CBT-I.

* Corresponding author.
E-mail address: cmorin@psy.ulaval.ca (C.M. Morin).

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- Benzodiazepines and z-drugs are effective for short-term management, despite concerns about adverse effects and tolerance. Some evidence demonstrated a relative lack of tolerance of eszopiclone.
- Dual orexin antagonists (DORA) may have benefits that outweigh their risks for long-term use (e.g., no tolerance in 12-month studies and absence of rebound in controlled clinical trial).
- There is lack of evidence on the use of melatonin for insomnia treatment; on the long-term effect of cannabinoids; and the benefits of off-label medications (e.g., antidepressants and antipsychotics), in addition to the concerns about their safety profiles.

Key Points

•Despite the availability of algorithms for managing chronic insomnia, more evidence-based guidance is needed to help Canadian healthcare providers select the most suitable interventions, especially with the recent approval of new treatments.
•Based on the review of evidence, experts reached a consensus on recommendations that (1) reinforce the role of Cognitive-Behavioural Therapy for Insomnia as a first-line treatment; (2) assist healthcare providers in effectively integrating the newly approved medication therapies in their treatment decisions; and (3) emphasize the importance of exercising caution when using frequently prescribed medications for which the evidence is limited or the risk/benefit low.

1. Introduction

Insomnia, a common sleep disorder, has seen a 42 % increase among Canadian adults between 2007 and 2015 (from 16.8 % prevalence in 2007–2009 to 23.8 % in 2014–2015) [1]. Classification systems such as ICSD-3-TR and DSM-5-TR (Supplementary Table 1) characterize this disorder as dissatisfaction with sleep quality and duration, despite having sufficient time and opportunity for sleep [2,3]. The key symptoms include.

- difficulty falling asleep or staying asleep,
- waking up too early in the morning,
- sleep disturbance that causes significant daytime impairment,
- occurs three or more nights per week and persist for at least three months.

Chronic insomnia has a detrimental impact on an individual's quality of life (QoL), mental and physical health, and occupational performance [4].

Although cognitive-behavioural therapy for insomnia (CBT-I) is the recommended first-line treatment in practice guidelines, pharmacological interventions remain the most widely used treatment in clinical practice [5,6] due to factors such as limited access to CBT-I, financial constraints, and provider awareness. As chronic insomnia is a complex disorder often associated with various comorbidities, its effective management may also require treating the relevant comorbidities with a combination of behavioural and pharmacological interventions.

The optimal management of insomnia in Canada remains a challenge due to the lack of sufficient guidance for healthcare providers (HCP). Evidence-based recommendations are needed to help HCPs choose appropriate interventions and improve health outcomes in individuals with chronic insomnia. Available insomnia management algorithms in Canada [7,8] do not include newly approved pharmacological agents, and recent international guidelines [9–12] and consensus recommendations [13] may not apply to the Canadian healthcare system because of differences in funding models, available medications, and resources. This report aims to synthesize up-to-date expert consensus recommendations to improve the management of chronic insomnia in Canada.

2. Composition of the committee

A panel of 16 Canadian HCPs spanning various disciplines (family medicine, pharmacy, psychiatry, psychology, and neurology) and specializing in sleep medicine and insomnia, developed consensus recommendations on the epidemiology, diagnosis, and treatment of chronic insomnia (Supplementary Table 2).

3. Methods

Three members (CM, AK, and RR) co-chaired and oversaw the consensus-building process (Supplementary Method). They drafted the initial recommendations following a thorough review of the literature and guidelines. The Delphi method was then used [14] to reach consensus among all panelists (Fig. 1). Consensus was reached if at least 75 % of the voting participants "agreed" or "strongly agreed" (on a Likert scale) with the corresponding statements. Consensus were considered *strong* if more participants "strongly agreed" or *moderate* if more participants "agreed". The quality of supporting evidence was rated using a GRADE rating system (Supplementary Table 3).

4. Report

From March to August 2023, 13 to 15 panellists participated in four e-Delphi rounds. By statement, the number of responses oscillated between 12 and 15 throughout the four rounds (84 % median participation rate per round). Between 74 % and 91 % of statements per round reached consensus levels. Statements not reaching consensus were revised, between each round, sometimes after very constructive discussions from the panellists. After four rounds, consensus was achieved on 37 statements in epidemiology (n = 6), diagnosis (n = 11), and treatment (n = 20).

4.1. Epidemiology

Consensus was reached regarding the high prevalence of insomnia, its strong association with numerous comorbidities, and its detrimental effects on health outcomes and QoL (Table 1). This is not surprising given that insomnia affects one in seven Canadians [1]. In a survey of 2000 Canadians, more than 40 % reported experiencing at least one insomnia symptom (trouble falling asleep, trouble staying asleep, and early morning awakening) for at least three nights per week and nearly 13.5 % reported symptoms that lasted for at least one month with reported daytime impairment [15].

Based on high-quality evidence, the panelists strongly recommend to not underestimate the burden of chronic insomnia, which is associated with significant and wide-ranging morbidities in mental, physical, and occupational health. Specifically, chronic insomnia increases the risk of depression, anxiety, substance use disorder, suicidality, weight gain, cardiovascular issues, all-cause death, and fatigue-related accidents [4,

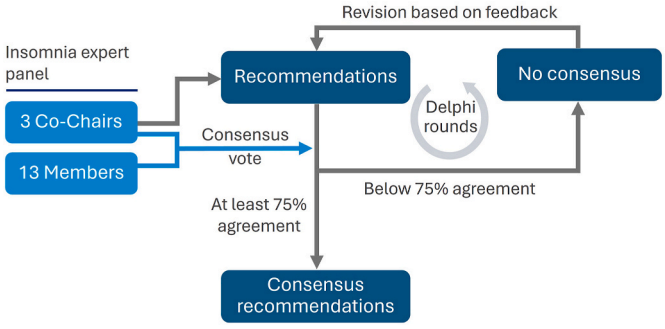

Fig. 1. Method followed to reach consensus on recommendations for the management of chronic insomnia.

Table 1
Epidemiology consensus statements.[a].

Epidemiology statement	Consensus level	Statements	Consensus strength	Evidence quality[b]	Round	N
ES1	100 %	Insomnia disorder is highly comorbid with a variety of other sleep, mental, and physical disorders. Some of the most common ones include anxiety, mood disorders, sleep-disordered breathing, and chronic pain.	Strong	High	4	13
ES2	100 %	The burden of chronic insomnia should not be underestimated, as it is associated with significant and wide-ranging morbidities on mental, physical, and occupational health.	Strong	High	1	13
ES3	85 %	Insomnia disorder is a highly prevalent condition.	Strong	High	1	13
ES4	85 %	Insomnia is a risk factor for depression, anxiety disorder, alcohol abuse or dependence, drug abuse or dependence, suicide, weight gain, and cardiovascular risk.	Strong	Moderate	1	13
ES5	80 %	Insomnia disorder usually follows a persistent course, with periods of improvement or remission experienced only by some individuals.	Moderate	Moderate	2	15
ES6	77 %	In the majority of cases, insomnia disorder has a long-term course that requires a chronic disease management model.	Moderate	Moderate	1	13

MAD: median absolute deviation; N: number of participants to the round; QCD: quartile coefficient of dispersion.
[a] Consensus strength, level, and evidence quality are given for the round at which the statements reached consensus level.
[b] See Supplementary Table 3 for details. The epidemiology statements (ES) are ordered by consensus strength followed by the consensus level. The median (MAD, QCD) consensus level for epidemiology statements was 84.6 % (6.2 %, 8.5 %).

16–18]. In a large five-year study of Canadian adults followed up annually, insomnia was persistent in 42 % of those with insomnia at baseline [19]. Therefore, long-term management may be required.

4.2. Diagnosis

The panellists strongly recommend that even when insomnia co-occurs with other sleep, mental, or physical health conditions, it should be assessed as a potentially distinct condition (diagnosis statement [DS] 2; Table 2, Fig. 2). Diagnosis for insomnia should include a thorough history to identify the nature of insomnia complaints (initial, middle, and late insomnia) and comorbid sleep, mental, and physical health conditions (DS3). This includes screening for comorbid obstructive sleep apnea (OSA) (DS1), considering the high prevalence of insomnia symptoms (40–60 %) in patients with OSA [20]. Comorbid conditions may potentiate the consequences of insomnia on both

Table 2
Diagnosis consensus statements.[a].

Diagnosis statement	Consensus level	Statements	Consensus strength	Evidence quality[b]	Round	N
DS1	100 %	Given the high prevalence[c] of comorbid insomnia and sleep apnea (COMISA), individuals with insomnia should be screened, at least by history, for comorbid OSA.	Strong	High	3	15
DS2	100 %	Even when insomnia symptoms co-occur with other sleep, mental, or physical health conditions, assessments for insomnia disorder as a potentially distinct condition should be conducted.	Strong	Moderate to high	1	12
DS3	83 %	The diagnosis algorithm should include a thorough history to identify the nature of insomnia complaints (initial, middle, late insomnia), and how it is affecting daytime functions. Comorbid sleep, mental or physical health conditions must be identified (e.g., OSA, CHF, RLS, limb movement disorders, pain, overactive bladder, mood and anxiety disorders).	Strong	Moderate	1	12
DS4	83 %	Polysomnography (sleep studies) should be considered in the assessment of insomnia when there is suspicion of other sleep pathologies (e.g., sleep apnea).	Strong	Moderate	1	12
DS5	100 %	Measurement-based care with short patient-rated scales such as the insomnia severity index, PHQ-9, GAD-7, and STOP-Bang, can assist in outlining the nature and severity of insomnia as well as major comorbidities.	Moderate-to-strong	Moderate	1	12
DS6	100 %	Most commercial sleep trackers, such as wearables, have not been well validated in individuals with sleep disorders.	Moderate	Moderate	4	13
DS7	92 %	While advances relating to sleep trackers are encouraging, data from such devices should be used with caution as they may lead to incorrect assumptions about sleep amount and quality.	Moderate	Moderate	4	13
DS8	83 %	Substance use (e.g., alcohol, cannabis or recreational psychoactive drugs) should be investigated to ensure people with insomnia disorder are not using these agents to self-medicate for sleep problems or related daytime symptoms.	Moderate	Moderate	1	12
DS9	80 %	Since only a small percentage of people with insomnia disorder will seek medical attention, healthcare providers must be proactive by asking simple screening questions as part of their routine examination, e.g., “Do you have trouble falling or staying asleep?”, “Do you feel refreshed when you wake up in the morning?”, or “Do you feel like your sleep problem interferes with your daytime functioning?”	Moderate	Moderate	2	15
DS10	80 %	In-lab PSG may be required to supplement ambulatory or home-based PSG in certain cases when OSA or other major sleep disorders are suspected as a comorbid condition with insomnia	Moderate	Moderate	2	15
DS11	75 %	The use of a sleep diary should be standard procedure in the assessment and management of insomnia.	Strong	Moderate	1	12

CHF: congestive heart failure; GAD-7: generalized anxiety disorder assessment, 7-item; MAD: median absolute deviation; N: number of participants to the round; OSA: obstructive sleep apnea; PHQ-9: patient health questionnaire 9-item; PSG: polysomnography; QCD: quartile coefficient of dispersion; RLS: restless legs syndrome; STOP-Bang: snoring, tiredness, observed apnea, high blood pressure, BMI, age, neck circumference, and male gender.
[a] Consensus strength, level, and evidence quality are given for the round at which the statements reached consensus level.
[b] See Supplementary Table 3 for details. The diagnosis statements (DS) are ordered by consensus strength followed by the consensus level.
[c] Prevalence of insomnia in individuals with OSA is estimated between 40 % and 60 % [20]. The median (MAD, QCD) consensus level for diagnosis statements was 83.3 % (8.3 %, 10.1 %).

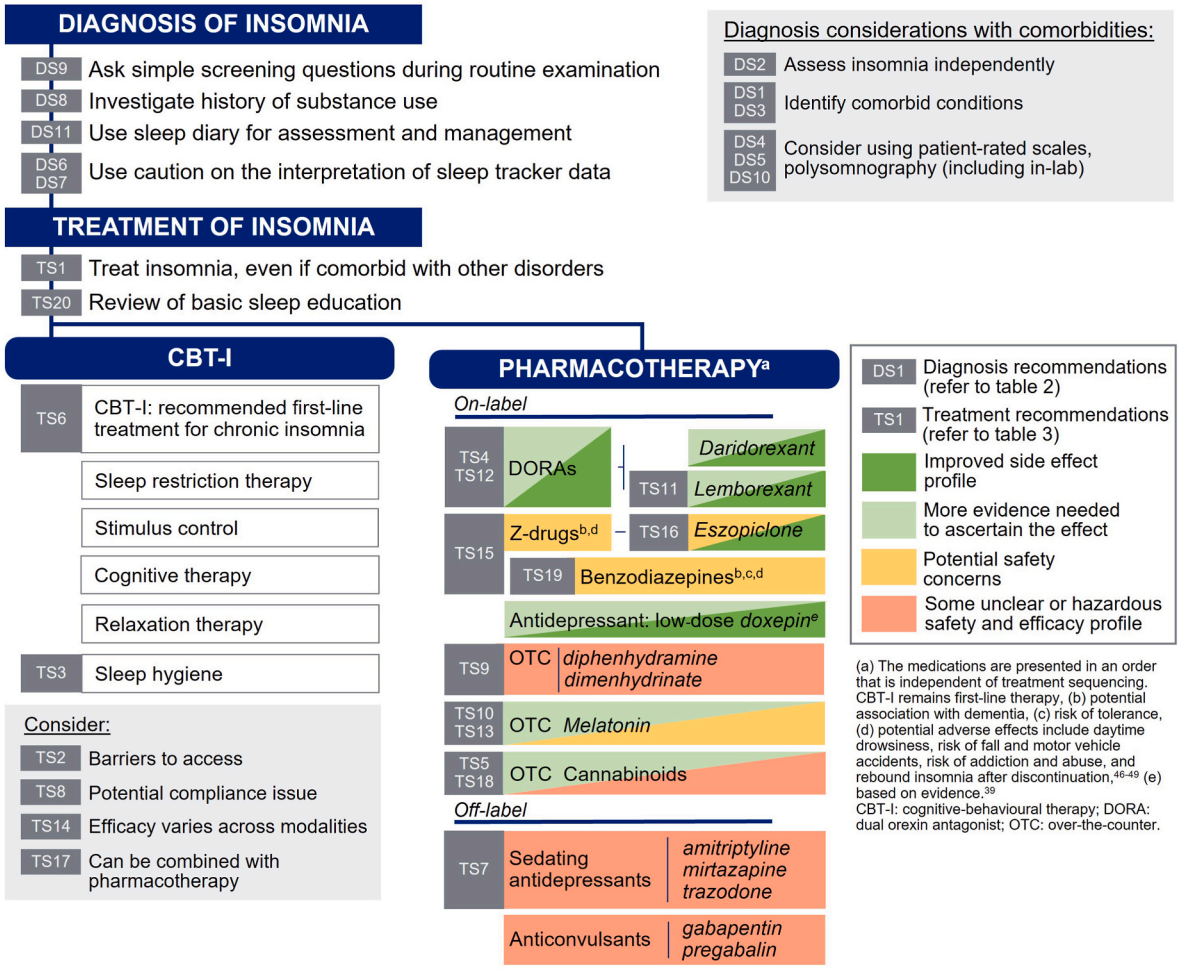

Fig. 2. Diagnosis and treatment principles for the management of chronic insomnia in Canada based on consensus statements from a Delphi study.

physical and mental health [21]. Measurement-based care with short patient-rated scales, such as ISI (Insomnia Severity Index) [22], PHQ-9 (Patient Health Questionnaire 9-item) [23], GAD-7 (Generalized Anxiety Disorder 7-item) [24], and STOP-Bang (Snoring, Tiredness, Observed apneas, Pressure-BMI, Age, Neck circumference, and Gender) [25], can assist in outlining the nature and severity of insomnia and comorbidities (DS5). Other scales such as AIS (Athens Insomnia Scale) and SCI (Sleep Condition Indicator) may also be considered [26]. Nevertheless, further studies are required to validate the performance of these scales [27,28] for as screening comorbidities in individuals with insomnia in different clinical settings.

Because few Canadians with insomnia seek medical attention [15], HCPs should proactively ask simple sleep-related screening questions about difficulties falling or staying asleep and address the perceived contribution of such difficulties to daytime functioning during routine examination (DS9). Polysomnography (PSG) may be considered in the assessment of insomnia when suspicion of other sleep pathologies arises, especially sleep apnea (DS4). In-lab PSG may be required to supplement ambulatory or home-based PSG when comorbid sleep disorders are suspected (DS10), although access may be limited by long wait times and lack of provincial coverage. Data from sleep trackers should be used with caution when estimating sleep amount and quality (DS7), despite encouraging advances [29].

4.3. Treatment

Consensus from the panelists (Table 3; Fig. 2) reinforces the role of CBT-I as the first-line treatment for insomnia disorder for all affected individuals (treatment statement [TS] 6), even in the context of comorbid conditions. CBT-I can be used in various modalities (in-person, virtual, self-help, group), although efficacy and adherence may vary accordingly (TS8). Meta-analyses of randomized controlled trials (RCT) suggest that CBT-I provides sustained improvements in sleep-onset latency, wake-after-sleep onset, total sleep time, and sleep efficiency [30]. It can also alleviate associated psychological symptoms such as depression and anxiety disorders [31,32].

However, more resources are needed to overcome barriers to CBT-I accessibility (TS2) such as the scarcity of trained specialists. RCTs data also suggest that 30%–35 % of individuals do not respond [33], which may result from limited modality compliance, sub-optimal delivery, and its time consuming nature [34]. Four to six biweekly CBT-I sessions are likely required to produce long-term improvements [35]. Abbreviated versions of CBT-I or single behavioural therapy components involving stimulus control or sleep restriction may help when multicomponent CBT-I is not available or feasible [36]. However, sleep hygiene education alone is insufficient to treat insomnia disorder [37]. Prioritizing populations that may benefit the most from CBT-I could help when capacity is limited [38]. CBT-I can sometimes be combined with pharmacotherapy (TS17), although optimal ways of combining and sequencing, and considerations for deprescribing, should be established.

A variety of classes of medications with different safety and efficacy are used to treat insomnia disorder. They include benzodiazepines, z-drugs, dual orexin antagonists (DORA), antidepressants and antihistaminergic drugs such as doxepin [39].

Benzodiazepines (e.g., flurazepam, temazepam) and z-drugs (e.g., eszopiclone, zolpidem, zopiclone) are commonly used in Canada [40].

Table 3
Treatment consensus statements.[a].

Treatment statement	Consensus level	Statements	Consensus strength	Evidence quality[b]	Round	N
TS1	100 %	Whenever insomnia is comorbid with another psychiatric disorder (e.g., depression, anxiety), insomnia should still be a specific target for treatment at some point in the treatment plan.	Strong	High	1	12
TS2	92 %	There are significant barriers to CBT-I accessibility, and more resources are needed to enable patients to access this recommended first line of treatment.	Strong	High	1	12
TS3	92 %	Basic "sleep hygiene" is often not enough and does NOT constitute CBT-I for insomnia.	Strong	High	1	12
TS4	92 %	Emerging evidence suggests that DORAs may have benefits that outweigh their risks in the pharmacological management of insomnia disorder.	Strong	Moderate	4	13
TS5	92 %	More research is required of the various types of cannabinoids and long-term effects on insomnia.	Strong	Low-to-moderate	1	12
TS6	83 %	CBT-I is the recommended first-line treatment for insomnia: all patients should be offered CBT-I in the treatment course.	Strong	High	1	12
TS7	92 %	Off-label medications used in treating insomnia such as antidepressants (e.g., mirtazapine and trazodone) and antipsychotics (e.g., quetiapine) have unclear or hazardous safety and efficacy profiles that may outweigh their benefits.	Moderate-to-strong	Moderate	3	12
TS8	83 %	There may be problems of compliance with CBT-I for certain patients (e.g., variable adherence based on modality).	Moderate-to-strong	High	1	12
TS9	100 %	Some over-the-counter medications used in treating insomnia (e.g., dimenhydrinate and diphenhydramine) have unclear or hazardous safety and efficacy profiles that may outweigh their benefits.	Moderate	High	4	13
TS10	100 %	The lack of control and regulation on manufacturing and purity of melatonin in Canada poses a challenge to its use. All natural health products used to manage insomnia (e.g., melatonin) should display eight-digit NPN (natural product number) to ensure their safety and quality have been assessed by Health Canada.	Moderate	Moderate	4	13
TS11	100 %	Although further research with specific subpopulation data is needed, there is evidence of lack of drug tolerance[c] as a result of the chronic use of lemborexant for insomnia over up to 12 months.	Moderate	Moderate	4	13
TS12	100 %	DORAs have a side effect profile that may be more favourable compared to benzodiazepines, BZRA agents, and some commonly prescribed pharmacotherapies for insomnia.	Moderate	Moderate	4	13
TS13	92 %	Although there is currently no strong evidence supporting the use of exogenous melatonin for insomnia disorder, current research data suggest potential benefits for insomnia in certain populations (e.g., older adults, individuals with ADHD, neurodevelopmental disorders), as well as for circadian rhythm sleep-wake disorders.	Moderate	Moderate	4	13
TS14	92 %	CBT-I can be used in multiple modalities (virtual, self-help, face-to-face, group), although efficacy is not equivalent across modalities.	Moderate	Moderate	1	12
TS15	86 %	Although benzodiazepines and z-drugs affect memory, the potential association with dementia remains to be clarified.	Moderate	Moderate	2	14
TS16	86 %	There is evidence of lack of drug tolerance[c] as a result of the chronic use of eszopiclone for insomnia.	Moderate	Moderate	3	12
TS17	83 %	CBT-I can be combined with pharmacotherapy.	Moderate	Moderate	1	12
TS18	80 %	Although there is evidence that cannabis may improve sleep in patients with certain chronic diseases (e.g., pain), there is currently insufficient evidence to guide its use for insomnia.	Moderate	Low	2	15
TS19	79 %	There is a risk of tolerance[c] as a result of the chronic use of most benzodiazepine receptor agonists (BRZAs) for insomnia.	Moderate	Moderate	3	14
TS20	77 %	Treatment of insomnia should start with a review of basic sleep education	Moderate	High	4	13

ADHD: attention deficit/hyperactivity disorder; CBT-I: cognitive-behavioural therapy for insomnia; DORA: dual orexin receptor antagonist; GABA, γ-Aminobutyric acid; MAD: median absolute deviation; N: number of participants to the round; QCD: quartile coefficient of dispersion.

[a] Consensus strength, level, and evidence quality are given for the round at which the statements reached consensus level.

[b] See Supplementary Table 3 for details. The treatment statements (TS) are ordered by consensus strength followed by the consensus level. A revised version of treatment statement TS16 is the only statement that did not reach consensus level at the end of the e-Delphi process (round 4). However, the current TS16 did reach consensus level during the third e-Delphi round.

[c] Diminished effect at constant dose or need to increase dose for a similar effect. The median (MAD, QCD) consensus level for treatment statements was 91.7 % (8.3 %, 6.0 %).

Their ability to improve sleep duration and quality has been confirmed in multiple short-term (up to 4 weeks, approximately) and few long-term studies (3–12 months) [5,41–45]. However, these drugs are associated with potentially concerning adverse effects such as daytime drowsiness, risk of falls and motor vehicle accidents, risk of addiction and abuse, and rebound insomnia after discontinuation [46–49]. Although benzodiazepines and z-drugs affect memory (TS15) [50], their potential association with dementia remains to be clarified [51].

Emerging evidence suggests that DORAs may have benefits that outweigh their risks (TS4). RCTs have shown that DORAs improve various sleep outcomes in individuals with insomnia, including wake time after sleep onset, latency to persistent sleep, and total sleep time [52,53]. Two DORAs, daridorexant and lemborexant, are approved by Health Canada–although access may be limited due to coverage–for use in individuals with difficulties in sleep onset and/or maintenance [54–57]. No marked rebound or withdrawal signs or symptoms have been observed when treatment is discontinued, suggesting an improved safety profile compared to GABAergic agents and other commonly prescribed insomnia medications (TS12) [5,41–45,53,58]. In a recent large, non-industry funded meta-analysis that considered acute and long-term treatments, lemborexant and eszopiclone had a better efficacy, acceptability, and tolerability profiles relative to other agents [44]. Among the DORAs, lemborexant was more efficacious for improving sleep in both the short-term and long-term [44]. Although long-term (12 months) data for daridorexant were not available at the time the meta-analysis was conducted, exploratory efficacy from a placebo-controlled study also suggested sustained sleep improvement [59]. While further research within specific subpopulation is needed, there is evidence of lack of tolerance for the chronic use of lemborexant up to 12 months (TS11).

Low-dose doxepin, the only antidepressant approved for insomnia, has been shown to effectively improve sleep maintenance and total sleep duration [39]. Other antidepressants (e.g., amitriptyline, mirtazapine, trazodone), as well as antipsychotics (e.g., quetiapine) and anticonvulsants (gabapentin, pregabalin) are commonly used off-label medications for insomnia. However, evidence supporting their efficacy is inconsistent and their unclear or hazardous safety profiles (e.g., fall risk [60] or daytime drowsiness [61]) may outweigh their benefits (TS7). These drugs should be considered only in the context of treating comorbid psychiatric conditions (e.g., antidepressants or antipsychotics) [62,63].

Similarly, over-the-counter medications (e.g., antihistamines), also commonly used in Canada for the treatment of insomnia [40], have unclear or hazardous safety and efficacy profiles that may outweigh their benefits (TS9) [64–66].

The melatonergic system is a potential target for insomnia treatment and circadian rhythm disturbance [67–69]. Despite evidence of improvements in certain populations treated with exogenous melatonin (e.g., older adults, individuals with ADHD, neurodevelopmental disorders), no strong evidence support their clinical benefits in the treatment of insomnia (TS13) [68–70]. Melatonin and other natural health products used to manage insomnia should display the eight-digit NPN (natural product number) to ensure that their safety and quality have been assessed by Health Canada (TS10).

Finally, despite some evidence that cannabis may improve sleep in individuals with certain chronic diseases (e.g., chronic pain) [71], more research is required to assess effects (TS5) or guide its use in insomnia management (TS18).

4.4. Limitations

This study's limitations include the relatively small number of experts, their representation per specialty, clinic type, and province, and inherent self-selection bias due to purposive sampling. Furthermore, not all relevant stakeholders (e.g., patients, nurses, and policymakers) participated in the study. Few of the consensus statements (low quality evidence) were based on practical experience rather than published evidence However, these offer a pragmatic framework and are particularly useful in guiding clinical practice regarding aspects of insomnia management for which high-quality evidence is limited.

5. Conclusions

Using the well-established Delphi method, this study provides consensus on the epidemiology, diagnosis, and management of insomnia disorder in Canada based on evidence from clinical trials and practice experience. The management of insomnia disorder is challenging and often suboptimal, partly because of poor access to and awareness of CBT-I, and the fact that insomnia disorder is often associated with various medical and psychiatric comorbidities. Initiatives involving multiple stakeholders are needed to promote education, increase access to CBT-I, and improve application of recommendations and guidelines, as well as to increase the number of Canadians in whom insomnia disorder is formally diagnosed and appropriately managed. Efforts are also needed to reduce self-medication and the use of over-the-counter and off-label medications with limited evidence or low benefit-risk ratios in favour of newer pharmacotherapy such as DORAs that may be safer for long-term use. Proper guidelines and frameworks are needed to set boundaries and principles for safe and effective chronic treatment.

CRediT authorship contribution statement

Charles M. Morin: Writing – review & editing, Validation, Methodology, Conceptualization. **Atul Khullar:** Writing – review & editing, Validation, Methodology, Conceptualization. **Rebecca Robillard:** Writing – review & editing, Methodology, Investigation, Conceptualization. **Alex Desautels:** Writing – review & editing, Methodology, Formal analysis. **Michael S.B. Mak:** Writing – review & editing, Validation, Investigation. **Thien Thanh Dang-Vu:** Writing – review & editing, Validation, Investigation, Conceptualization. **Walter Chow:** Writing – review & editing, Validation, Investigation. **Jeff Habert:** Writing – review & editing, Writing – original draft, Validation, Investigation, Conceptualization. **Serge Lessard:** Writing – review & editing, Validation, Investigation. **Lemore Alima:** Writing – review & editing, Validation, Investigation. **Najib T. Ayas:** Writing – review & editing, Validation, Investigation. **James MacFarlane:** Writing – review & editing, Validation, Investigation. **Tetyana Kendzerska:** Writing – review & editing, Validation, Investigation. **Elliott K. Lee:** Writing – review & editing, Validation, Investigation. **Colleen E. Carney:** Writing – review & editing, Validation, Investigation.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: **Alex Desautels** reports operating grants: CHIR, AASM, FRQ-S, HSF; research contracts: Eisai and Takeda; advisory boards: Eisai, Paladin Labs and UCB; speaking engagements: Eisai, Jazz Pharma and Paladin Labs. **Jeffrey Habert** reports Advisory Board/Speaker: Boehringer, Eli-Lilly, Elvium, Takeda, Bausch, Astra-Zeneca, Novartis, Lundbeck, Novo-Nordisk, Janssen, Eisai, HLS, Otsuka, Idorsia Pfizer, Amgen, Abbvie, GSK, Bayer, Valeo; Scientific Committees/Speaker: MDBriefcase, Liv, MedPlan, Master Clinician Alliance, Academy, Bridge, PeerVoice, Seacourses, Thrombosis Canada, Meducom, CHRC, CPD Network, CTC, STA, CCRN, Telus Health, EOCI, AgenceUnik, Humber Hospital, ABPHE, CSEM. **Atul Kular** reports serving on advisory board/speaker for Elvium, Bausch, Lundbeck, Eisai, Otsuka, Idorsia, Abbvie, Jazz; scientific committees/speaker for ICPDHC CPD Network, CCRN, and Telus Health. **Serge Lessard** reports Advisory Board/Speaker: AbbVie, Biron, Bausch, Eisai, Elvium, Idorsia, Jazz, Takeda, Lundbeck, Janssen, Otsuka, Sunovi; Scientific Committees/Speaker: MD Briefcase, Liv, MedPlan, CCRN; research grants from: Allergan, Janssen. **Michael S.B. Mak** reports education grants, consulting and speaking fees with Eisai Inc; education grants and speaking fees with Paladin; education grants, consulting and speaking fees with Jazz Pharmaceuticals; education grants and stocks with ResMed; consulting and speaking fees with Idorsia. **Charles M. Morin** reports funding from the Canadian Institutes of Health Research, Fonds de recherche du Quebec, National Institutes of Health; consulting for Eisai, Idorsia, Haleon; royalties from Mapi Research Trust.

Appendix A. Supplementary data

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