

A search and screening of research that examines the biological, physiological, and psychological factors that contribute to, and prevent, the development of insomnia

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Introduction

Insomnia is a sleep disorder which impacts one's ability to fall asleep and stay asleep. It is the most common sleep-related condition, affecting approximately one-third of adults [1]. The causes and prevention of insomnia can be influenced by biological, psychological, and/or physiological factors. Some of the most common causes are stress, disruption of one's circadian rhythm, irregular and/or inadequate sleep schedule, mental health disorders, medications, and the ingestion of stimulants (e.g. caffeine, alcohol) [2]. Insomnia can be proactively prevented by maintaining a regular sleep pattern, being active, reducing overconsumption before sleeping, and putting away technological devices well in advance of going to sleep [3].

In the progression from planning the screening process in the review protocol to executing it, a few adjustments were made to ensure that the team was able to achieve the objectives of this review. The research questions were reduced and specified to focus on the factors which contribute to and prevent insomnia, rather than the distinctions between the contributing factors in multiple specific subgroups (e.g. elderly, youth). In addition, more comprehensive inclusion criteria were added to ensure that the team was sourcing information from consistent study types.

The prevalence of insomnia and its many causes highlight the importance of accessible, comprehensive, and understandable literature to inform the general population. In the process of researching this systematic review, it was discovered that while there is an enormous amount of material concerning insomnia, the vast majority of it is highly specific to a particular population, setting, outcome, etc. Thus, an objective of this review is to provide a more general collection of information which can be used to create a foundation of knowledge and direct readers to more specific sources as it relates to their unique circumstances.

Sample Search Queries

Database	Query	Filters
Google Scholar	(biological OR physiological OR psychological) (mental OR sleep* OR age OR cognitive OR stress OR disorder OR circadian) allintitle: "insomnia" (contribute OR cause* OR prevent* OR factor OR diagnose OR develop* OR affect OR relation* OR categorize)	Years (2012-2022) Language (English) Doctype (Any type) Sorting (By Relevance) Citations (Included)

UofT Libraries	(biological OR *psychological OR *physiological*) AND (biological AND * psychological AND *physiological) AND “*Insomnia” AND (*factors OR *contribute AND *Insomnia) AND (*Sleep Disorder OR *genetics OR *sleep) AND (*factors AND *cause AND *Insomnia AND * prevent OR *develop)	Years (2012-2022) Language (English) Doctype (Any) Citations (Included) Sorting (By Relevance)
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Inclusion criteria

Study design

Keywords and relevant concepts are included in search queries. Due to the qualitative nature of the research questions, the systematic research will be focused on cohort, case-control, and cross-sectional studies to best inform the observational quality of the review. Unpublished papers will be excluded.

Condition or domain being studied

Research regarding biological, physiological, and psychological factors as they pertain to insomnia will be included. Work studying the general population and particular subgroups of the population (e.g. women, men, youth, elderly) will be included. Research that discusses factors adjacent to biological, physiological, and psychological factors will be included. Research which discusses other sleep disorders will not be included.

Currency

Only work published within the last 10 years (2012 to present) will be included as research within this time frame can still be relevant.

Authority

Work must be published in a reputable, peer-reviewed journal.

Context

The number and currency of references for the research will be used to determine its accuracy. The publication history and education level of the authors will be assessed to determine their credibility. To determine the credibility of the work, additional research will be conducted for sponsors of the work. In addition, the academic and professional affiliations of the publisher and journal will be assessed. The above criteria are merely guidelines to direct the team members' investigation and assessment of a research source if there is cause to question its authority.

Search Results

See the appendix for complete search results. Google Scholar was utilized as the main database.

Prisma Diagram



List of Included Papers

Title	Author(s)	Year
Familial Risk for Insomnia Is Associated With Abnormal Cortisol Response to Stress [4]	Drake, C. L., Cheng, P., Almeida, D. M., Roth, T.	2017
Epidemiology of insomnia in college students: relationship with mental health, quality of life, and substance use difficulties [5]	Taylor, D. J., Bramoweth, A. D., Grieser, E. A., Tatum, J. I.m Roane, B. M.	2013

Aerobic Exercise affects sleep, psychological wellbeing and immune system parameters among subjects with chronic primary insomnia [6]	El-Kader, S. M. A., Al-Jiffri, O. H.	2020
Insomnia and its impact on physical and mental health [7]	Fernandez-Mendoza, Julio; Vgontzas, Alexandros N	2013
Sleep patterns and insomnia among adolescents: a population based study [8]	Hysing, Mari; Pallesen, Ståle; Stormark, Kjell M; Lundervold, Astri J; Sivertsen, Børge	2013
Temporal associations between morningness/eveningness, problematic social media use, psychological distress and daytime sleepiness: Mediated roles of sleep quality and insomnia among young adults [9]	Lin, Chung-Ying; Imani, Vida; Griffiths, Mark D; Broström, Anders; Nygårdh, Annette; Demetrovics, Zsolt; Pakpour, Amir H	2021
Psychological predictors of insomnia, anxiety and depression in university students: potential prevention targets [10]	Lindsay, Julia AB; McGowan, Niall M; King, Nathan; Rivera, Daniel; Li, Melanie; Byun, Jin; Cunningham, Simone; Saunders, Kate EA; Duffy, Anne	2022
Cognitive-behavioral approaches to the treatment of insomnia [11]	Morin, Charles M	2004
Sleep and pain: relationship and management [12]	O'Hagan, Edel	2017
Insomnia among patients with advanced disease during admission in a Palliative Care Unit: a prospective observational study on its frequency and association with psychological, physical and environmental factors [13]	Renom-Guiteras, Anna; Planas, José; Farriols, Cristina; Mojal, Sergi; Miralles, Ramón; Silvent, Maria A; Ruiz-Ripoll, Ada I	2014
Brain mechanisms of insomnia: new perspectives on causes and consequences [14]	Van Someren, Eus JW	2021
Insomnia and depression: clinical associations and possible mechanistic links [15]	Vargas, Ivan; Perlis, Michael L	2020
Physiologic indexes in chronic insomnia during a constant routine: evidence for general hyperarousal? [16]	Varkevisser, Michael; Van Dongen, Hans PA; Kerkhof, Gerard A	2005
Effect of digital cognitive behavioral therapy for Insomnia on Health, psychological well-being, and sleep related quality of Life: a randomized clinical trial [17]	Espie, Colin A; Emsley, Richard; Kyle, Simon D; Gordon, Christopher; Drake, Christopher L; Siriwardena, A Niroshan; Cape, John; Ong, Jason C; Sheaves, Bryony; Foster, Russell	2019

Hyperarousal and sleep reactivity in insomnia: current insights [18]	Kalmbach, David A; Cuamatzi-Castelan, Andrea S; Tonnu, Christine V; Tran, Kieulinh Michelle; Anderson, Jason R; Roth, Thomas; Drake, Christopher L	2018
Biological and clinical insights from genetics of insomnia symptoms [19]	Lane, Jacqueline M; Jones, Samuel E; Dashti, Hassan S; Wood, Andrew R; Aragam, Krishna G; van Hees, Vincent T; Strand, Linn B; Winsvold, Bendik S; Wang, Heming; Bowden, Jack	2019

List of Excluded Papers and Justification

See the appendix for the list of all excluded papers with justification on why they were excluded.

Discussion

In conclusion, the search process was conducted using a search query in Google Scholar using keywords like “biological,” “psychological,” “physiological,” “mental,” “health,” “insomnia,” “cause,” “effect,” and “develop” in order to narrow down the potential papers to ones that were more relevant to the specific topic. The results were that of 51 studies screened that were relevant to the topic. It was then narrowed down to 43 studies due to a lack of relevancy of certain papers. The papers were scrutinized further and removed due to limited access and incorrect study design. For the next research process, 15 papers were voted on.

The next step is to extract the data from the final 15 papers and present them in a summary of findings. In this next deliverable, group members will each choose 3 of the papers and perform a thorough data extraction process, which requires each member to read each paper and extract data to an extraction table. The table will have the data corresponding to 3 categories, which have been previously determined as biological, psychological, and physiological.

After data extraction has been completed, group members will organize the information, and will look for themes in order to decide upon the main themes for the final report. After that, a detailed report will be written to summarize the findings, the data extraction process, and the final results.

Appendix

List of Excluded Papers and Justification

Title	Author(s)	Year	Justification
Psychological stress is associated with heightened physiological arousal during NREM sleep in primary insomnia [20]	Hall, Martica; Thayer, Julian F; Germain, Anne; Moul, Douglas; Vasko, Raymond; Puhl, Matthew; Miewald, Jean; Buysse, Daniel J	2007	Wrong publication year
Therapeutic efficacy and safety of chamomile for state anxiety, generalized anxiety disorder, insomnia, and sleep quality: A systematic review and meta-analysis of randomized trials and quasi-randomized trials [21]	Hieu, Truong Hong; Dibas, Mahmoud; Surya Dila, Kadek Agus; Sherif, Nourin Ali; Hashmi, Muhammad Usman; Mahmoud, Mostafa; Trang, Nguyen Thi Thuy; Abdullah, Lava; Nghia, Thai Le Ba; Hirayama, Kenji	2019	Limited access
Insomnia and inflammation: a two hit model of depression risk and prevention [22]	Irwin, Michael R; Piber, Dominique	2018	Wrong study design
Doctorate in Clinical Psychology: Main Research Portfolio: Psychological factors associated with self-reported sleep disturbance in Chronic Fatigue Syndrome and insomnia [23]	Wilson, Flora	2015	Wrong study design
Digital cognitive behavioural therapy for insomnia versus sleep hygiene education: the impact of improved sleep on functional health, quality of life and psychological well-being. Study protocol for a randomised controlled trial [24]	Espie, Colin A; Luik, Annemarie I; Cape, John; Drake, Christopher L; Siriwardena, A Niroshan; Ong, Jason C; Gordon, Christopher; Bostock, Sophie; Hames, Peter; Nisbet, Mhairi	2016	Wrong setting
Emotion coping strategies and dysfunctional sleep-related beliefs are associated with objective sleep problems in young adults with insomnia [25]	Ballot, O; Daviaux, Y; Sanz-Arigita, EJ; Ivers, H; Micoulaud-Franchi, JA; Bioulac, S; Philip, P; Morin, CM; Altena, E	2021	Limited access
Physiological and psychological factors in sleep-onset insomnia.[26]	Freedman, Robert R; Sattler, Howard L	1982	Wrong publication year

Sex differences in insomnia: from epidemiology and etiology to intervention [27]	Suh, Sooyeon; Cho, Nayoung; Zhang, Jihui	2018	Limited access
Behavioral and psychological treatments for chronic insomnia disorder in adults: an American Academy of Sleep Medicine clinical practice guideline [28]	Edinger, Jack D; Arnedt, J Todd; Bertisch, Suzanne M; Carney, Colleen E; Harrington, John J; Lichstein, Kenneth L; Sateia, Michael J; Troxel, Wendy M; Zhou, Eric S; Kazmi, Uzma	2021	Wrong study design
Insomnia disorder in adolescence: diagnosis, impact, and treatment [29]	de Zambotti, Massimiliano; Goldstone, Aimee; Colrain, Ian M; Baker, Fiona C	2018	Limited access
Insomnia and psychiatric disorders [30]	Vargas, Ivan; Garland, Sheila N; Kloss, Jacqueline D; Perlis, Michael L	2019	Limited access
Who is predisposed to insomnia: a review of familial aggregation, stress-reactivity, personality and coping style [31]	Harvey, Christopher-James; Gehrman, Phil; Espie, Colin A	2014	Limited access
The effect of yoga on sleep quality and insomnia in women with sleep problems: a systematic review and meta-analysis [32]	Wang, Wei-Li; Chen, Kuang-Huei; Pan, Ying-Chieh; Yang, Szu-Nian; Chan, Yuan-Yu	2020	Limited access
Sleep-Wake Disorders and a Look at Insomnia through Biological and Behavioral Perspectives [33]	Fontanarosa, Mia	2017	Wrong study design
Epidemiology of insomnia: prevalence, course, risk factors, and public health burden [34]	Morin, Charles M; Jarrin, Denise C	2013	Limited access
Sleep Deprivation and Sleep-Onset Insomnia are Associated with Blunted Physiological Reactivity to Stressors [35]	Hansen, Devon A; Satterfield, Briann C; Layton, Matthew E; Van Dongen, Hans PA	2021	Wrong route of administration
Heart to Heart: Exploring Heart Rate Variability in Insomnia Patient Subtypes [36]	Dodds, Kirsty Lyn	2017	Limited access
Investigating psychological and physiological responses to the Trier Social Stress Test in young adults with insomnia [37]	Chen, Ivy Y; Jarrin, Denise C; Ivers, Hans; Morin, Charles M	2017	Limited access

Search Results via Google Scholar

Title	Author(s)	Year
Insomnia and psychiatric disorders [30]	Vargas, Ivan; Garland, Sheila N; Kloss, Jacqueline D; Perlis, Michael L	2019
Sleep and pain: relationship and management [12]	O'Hagan, Edel	2017
Heart to Heart: Exploring Heart Rate Variability in Insomnia Patient Subtypes [36]	Dodds, Kirsty Lyn	2017
Hyperarousal and sleep reactivity in insomnia: current insights [18]	Kalmbach, David A; Cuamatzi-Castelan, Andrea S; Tonnu, Christine V; Tran, Kieulinh Michelle; Anderson, Jason R; Roth, Thomas; Drake, Christopher L	2018
Investigating psychological and physiological responses to the Trier Social Stress Test in young adults with insomnia [37]	Chen, Ivy Y; Jarrin, Denise C; Ivers, Hans; Morin, Charles M	2017
Brain mechanisms of insomnia: new perspectives on causes and consequences [14]	Van Someren, Eus JW	2021
The impact of Alcohol Consumption on Sleep Onset and REM Latency; A Meta-Analytic Study [38]	Smith, Hannah Lane	2016
Insomnia and physiological hyperarousal is associated with hypertension [39]	Li, Yun; Vgontzas, Alexandros N; Fernandez-Mendoza, Julio; Bixler, Edward O; Sun, Yuanfeng; Zhou, Junying; Ren, Rong; Li, Tao; Tang, Xiangdong	2015
Insomnia and its impact on physical and mental health [7]	Fernandes-Mendoza, Julio; Vgontzas, Alexandros N	2013
Chronic insomnia and the stress system [40]	Basta, Maria; Chrousos, George P; Vela-Bueno, Antonio; Vgontzas, Alexandros N	2007
New developments in cognitive behavioral therapy as the first-line treatment of insomnia [41]	Siebern, Allison T; Manber, Rachel	2011
Physiologic indexes in chronic insomnia during a constant routine: evidence for general hyperarousal? [16]	Varkevisser, Michael; Van Dongen, Hans PA; Kerkhof, Gerard A	2005

Psychological stress is associated with heightened physiological arousal during NREM sleep in primary insomnia [20]	Hall, Martica; Thayer, Julian F; Germain, Anne; Moul, Douglas; Vasko, Raymond; Puhl, Matthew; Miewald, Jean; Buysse, Daniel J	2007
Cognitive-behavioral approaches to the treatment of insomnia [11]	Morin, Charles M	2004
Physiological and psychological factors in sleep-onset insomnia [26]	Freedman, Robert R; Sattler, Howard L	1982
Stress, sleep physiology, and related insomnia disorders [42]	Kim, Leen	2010
Cancer-related insomnia [43]	Induru, Raghava R; Walsh, Declan	2014
Insomnia and depression: clinical associations and public mechanistic links [15]	Vargas, Ivan; Perlis, Michael L	2020
Epidemiology of insomnia in college students: relationship with mental health, quality of life, and substance use difficulties [5]	Taylor, Daniel J; Bramoweth, Adam D; Grieser, Emily A; Tatum, Jolyn I; Roane, Brandy M	2013
Epidemiology of insomnia: prevalence, course, risk factors, and public health burden [34]	Morin, Charles M; Jarrin, Denise C	2013
Insomnia disorder in adolescence: diagnosis, impact, and treatment [29]	de Zambotti, Massimiliano; Goldstone, Aimee; Colrain, Ian M; Baker, Fiona C	2018
Insomnia among patients with advanced disease during admission in a Palliative Care Unit: a prospective observational study on its frequency and association with psychological, physical and environmental factors [13]	Renom-Guiteras, Anna; Planas, José; Farriols, Cristina; Mojal, Sergi; Miralles, Ramón; Silvent, Maria A; Ruiz-Ripoll, Ada I	2014
Familial risk for insomnia is associated with abnormal cortisol response to stress [4]	Drake, Christopher L; Cheng, Philip; Almeida, David M; Roth, Thomas	2017
Who is predisposed to insomnia: a review of familial aggregation, stress-reactivity, personality and coping style [31]	Harvey, Christopher-James; Gehrman, Phil; Espie, Colin A	2014
Sex differences in insomnia: from epidemiology and etiology to intervention [27]	Suh, Sooyeon; Cho, Nayoung; Zhang, Jihui	2018

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Temporal associations between morningness/eveningness, problematic social media use, psychological distress and daytime sleepiness: Mediated roles of sleep quality and insomnia among young adults [9]	Lin, Chung-Ying; Imani, Vida; Griffiths, Mark D; Broström, Anders; Nygårdh, Annette; Demetrovics, Zsolt; Pakpour, Amir H	2021
Digital cognitive behavioural therapy for insomnia versus sleep hygiene education: the impact of improved sleep on functional health, quality of life and psychological well-being. Study protocol for a randomised controlled trial [24]	Espie, Colin A; Luik, Annemarie I; Cape, John; Drake, Christopher L; Siriwardena, A Niroshan; Ong, Jason C; Gordon, Christopher; Bostock, Sophie; Hames, Peter; Nisbet, Mhairi	2016
Aerobic exercise affects sleep, psychological wellbeing and immune system parameters among subjects with chronic primary insomnia [6]	Abd El-Kader, Shehab M; Al-Jiffri, Osama H	2020
Sleep Deprivation and Sleep-Onset Insomnia are Associated with Blunted Physiological Reactivity to Stressors [35]	Hansen, Devon A; Satterfield, Briann C; Layton, Matthew E; Van Dongen, Hans PA	2021
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Doctorate in Clinical Psychology: Main Research Portfolio: Psychological factors associated with self-reported sleep disturbance in Chronic Fatigue Syndrome and insomnia [23]	Wilson, Flora	2015
Sleep patterns and insomnia among adolescents: a population-based study [8]	Hysing, Mari; Pallesan, Ståle; Stormark, Kjell M; Lundervold, Astri J; Sivertsen, Børge	2013
The effect of yoga on sleep quality and insomnia in women with sleep problems: a systematic review and meta-analysis [32]	Wang, Wei-Li; Chen, Kuang-Huei; Pan, Ying-Chieh; Yang, Szu-Nian; Chan, Yuan-Yu	2020

Therapeutic efficacy and safety of chamomile for state anxiety, generalized anxiety disorder, insomnia, and sleep quality; A systematic review and meta-analysis of randomized trials and quasi-randomized trials [21]	Hieu, Truong Hong; Dibas, Mahmoud; Surya Dila, Kadek Agus; Sherif, Nourin Ali; Hashimi, Muhammad Usman; Mahmoud, Mostafa; Trang, Nguyen Thi Thuy; Abdullah, Lava; Nghia, Thai Le Ba; Hirayama, Kenji	2019
The effect of melatonin on sleep quality and insomnia in patients with cancer: a systematic review study [44]	Jafari-Koulaee, Azar; Bagheri-Nesami, Masoumeh	2021
Emotion coping strategies and dysfunctional sleep-related beliefs are associated with objective sleep problems in young adults with insomnia [25]	Ballot, O; Daviaux, Y; Sanz-Arigita, EJ; Ivers, H; Micoulaud-Franchi, JA; Bioulac, S; Philip, P; Morin, CM; Altena, E	2021
Predictors of insomnia onset in adolescents in Japan [45]	Tokiya, Mikiko; Kaneita, Yoshitaka; Itani, Osamu; Jike, Maki; Ohida, Takashi	2017
Psychological predictors of insomnia, anxiety and depression in university students: potential prevention targets [10]	Lindsay, Julia AB; McGowan, Niall M; King, Nathan; Rivera, Daniel; Li, Melanie; Byun, Jin; Cunningham, Simone; Saunders, Kate EA; Duffy, Anne	2022
Insomnia and inflammation: a two hit model of depression risk and prevention [22]	Irwin, Michael R; Piber, Dominique	2018
Biological and clinical insights from genetics of insomnia symptoms [19]	Lane, Jacqueline M; Jones, Samuel E; Dashti, Hassan S; Wood, Andrew R; Aragam, Krishna G; van Hees, Vincent T; Strand, Linn B; Winsvold, Bendik S; Wang, Heming; Bowden, Jack	2019
Types of insomnia [46]	Perlis, Michael; Gehrman, Phil	2013

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