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I Can't Get No Sleep: An Exploration of Sleep Quality in Stigmatised Groups.

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# I Can't Get No Sleep: <br> An Exploration of Sleep Quality in Stigmatised Groups. 

Nia Sheppard<br>North Wales Clinical Psychology Programme



# PRIFYSGOL <br> B A N G OR 

UNIVERSITY

Submitted in partial fulfilment for the degree of Doctorate in Clinical Psychology

June 2021

## Declaration

I hereby declare that this thesis is the results of my own investigations, except where otherwise stated. All other sources are acknowledged by bibliographic references. This work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree unless, as agreed by the University, for approved dual awards.

M. Shend.

Nia Sheppard

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## Thesis Abstract

A systematic review in chapter one examined the prevalence of insomnia and poor sleep quality within the prison population. The review synthesised the findings from twelve studies from various prisons internationally between 2014 and 2020. Wideranging prevalence rates were found from studies utilising self-report measures of sleep quality. Despite limitations in the literature reviewed, including the use of inconsistent parameters of standardised measures, the results suggest that the prevalence of insomnia and poor sleep quality in the prison population is higher than the general population. The review indicated an increase in the quantity and quality of studies compared to previous reviews. Areas for further research are discussed and recommendations for adequate identification and intervention of insomnia in prisons.

An empirical study in chapter two explored the sleep quality and wellbeing of people in recovery from substance addiction, compared to a control sample. Fiftynine participants in recovery from substance addiction and fifty-seven comparison group participants were recruited and completed a battery of self-report measures on sleep quality, anxiety, depression and quality of life. Results indicated that the recovery group had significantly poorer reported measures in all areas. However, anxiety was found to be the biggest predictor of poor sleep across both participant groups. Clinical implications, considerations for future research and limitations of the study are discussed.

The third and final chapter considers the theoretical, research and clinical implications that arose from the first two papers. A short reflective summary concludes the thesis.

## Chapter 1

Systematic Review

# Prevalence of Insomnia and Poor Sleep Quality in the Prison Population: 

## A Systematic Review.

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#### Abstract

Insomnia is a public health concern with several associated negative health-related outcomes. Risk factors for insomnia places the prison population at an increased risk of inadequate sleep. This paper systematically reviewed the literature reporting on the prevalence of insomnia and poor sleep quality in the prison population. Following a comprehensive database search and screening process, twelve studies were eligible for inclusion in this review. Six studies provided prevalence rates for insomnia and nine for poor sleep quality. Varied prevalence rates were found for insomnia (i.e., $26.2 \%$ to $72.5 \%$ ) and poor sleep quality (i.e., $42.8 \%$ to $88.2 \%$ ). Evaluation of the prevalence rates revealed varied measurement of sleep quality, inconsistent parameters of standardised measures, and methodological heterogeneity. Other considerations were given to geographical differences, the use of self-report data, gender difference, environmental factors and comorbidities of insomnia. The review highlighted an increase in the quantity of studies and some improved quality; although the findings were highly variable, in the main, inadequate sleep amongst prisoners was higher than the general population. Limitations of the review and implications for further research are discussed.


Keywords: insomnia, sleep quality, prevalence, prison, systematic review.

## Introduction

Insomnia is defined as inadequate sleep duration, initiation or consolidation that results in sleep dissatisfaction and daytime impairment (American Academy of Sleep Medicine, 2014). Population prevalence rates reported in a variety of studies globally, estimated that approximately 30\% of adults report one or more insomnia symptom (Roth, 2007). To formally diagnose insomnia disorder, the Diagnostic and Statistical Manual of Mental Disorders, $5^{\text {th }}$ edition (DSM-5) specifies one of three symptoms: (1) difficulty initiating sleep, (2) difficulty maintaining sleep (frequent awakenings) or (3) unwanted early-morning awakenings (with inability to return to sleep). The symptoms must cause distress or impairment in functioning, be present for at least three times a week for three months and not be attributable to another sleep disorder, psychiatric disorder or drug usage (American Psychiatric Association, 2013). In accordance with this diagnostic criteria, the population prevalence (in America and Europe) is believed to be around 6-10\% (Morin \& Benca, 2012; Riemann et al., 2017; Roth, 2007). Geographical variations have been found including lower insomnia prevalence in Asian countries (Cao et al., 2017).

Due to the subjective and personal nature of sleep, diagnosing insomnia can be difficult; additionally, diagnostic criteria continue to evolve as we find out more about insomnia (National Sleep Foundation, 2020a). There are many standardised measurements designed to identify insomnia symptoms (e.g., Bastien, 2001; Buysse et al., 1989) alongside diagnostic interview, sleep diary and objective sleep measurement (e.g., polysomnography and actigraphy). These types of measures capture clinical and subclinical insomnia, or poor quality sleep. There are a number of risk factors known for insomnia: insomnia is more prevalent among females and
those of older age; insomnia is also often comorbid with mental health conditions, substance misuse and certain medical complaints (Bos \& Macedo, 2019; Morin \& Benca, 2012; National Sleep Foundation, 2020a).

Prisoners are a vulnerable group who have an elevated risk of insomnia. The prison environment can have a negative impact on sleep for a large proportion of inmates due to poor sleep hygiene because of institutionalisation, boredom, a lack of activity, noise, overcrowding, light, temperature and discomfort (Barker et al., 2016; Dewa et al., 2015, 2017; Elger, 2007). In addition, prison populations are known to have elevated incidences of mental health conditions (Fazel \& Danesh, 2002) consequently increasing the risk further (Dewa et al., 2015).

It is important that there is appropriate recognition and management of insomnia in prisons. The consequences of substandard sleep include cognitive impairment, increased aggression, reduced impulse control, emotional dysregulation, increased risk of accidents and serious physical health conditions directly linked to mortality (see review by Bos \& Macedo, 2019). The National Sleep Foundation (2020b) recommends that adults have between seven and nine hours of sleep a night to help mitigate such risks. Given the multitude of possible factors contributing to poor sleep in the prison population, the distinction between primary and secondary insomnia must be considered. Primary insomnia defines organically caused sleep disruption, whereas secondary insomnia describes insomnia that is a side-effect of another problem such as a medical or psychiatric disorder. Elger (2007) reported that insomnia in prisons should not be assumed to be a secondary problem of illness or substance misuse as it often appears to be an independent situational problem.

There have been two notable reviews previously: Elger_(2007) conducted a non-systematic scoping review into insomnia in prison settings that comprised nine studies; and more recently, Dewa et al. (2015) conducted a comprehensive integrative review looking into prevalence, correlates and management of insomnia in prisons. Dewa et al. systematically reviewed 33 studies and identified five themes: (1) the varied prevalence of insomnia, (2) the comorbidity with psychiatric disorder and substance misuse, (3) the negative impact of environmental factors in prisons, (4) the prescription of hypnotic medication and (5) evidence that nonpharmacological treatment can help improve sleep. Twelve of the studies reviewed reported the prevalence of insomnia, where prevalence was found to range from 10.9\% to 81\% based on studies between 1974 and 2012. They concluded that the reviewed studies varied significantly in their quality and in the measurement of insomnia (e.g., a lack of standardised tools matched to diagnostic criteria and of insomnia measured as an impartial factor rather than within the measurement of comorbid conditions). Included within the recommendations were calls for future research to (a) use validated and objective measures of insomnia where possible, (b) improve the estimation of prison insomnia and (c) develop protocols to intervene appropriately.

In line with these recommendations, the aim of this paper was to systematically review the literature on insomnia and poor sleep quality prevalence in prison populations since the previous review, and to examine whether there had been improvement in the quantity and quality of the research. It was hoped that this would provide a more accurate estimation of prevalence which would help support
the importance of recognition and subsequent management of insomnia and poor sleep quality in prisons.

## Method

## Search Strategy

Electronic databases were searched in February 2021. The databases searched were Web of Science (core collection by 'topic'); CINAHL (including MEDLINE, in unselected fields by Boolean search mode); PsycINFO (in ‘anywhere’) and PubMed central (in all fields). Restrictions placed upon the search criteria were publication dates between 2010 and 2021, full-text, English language and peer-reviewed publications. The search terms used were: ("sleep quality" OR "sleep disorder*" OR "sleep disturb*" OR "disturbed sleep*" OR "poor sleep" OR insomnia* OR sleepiness OR sleepless* OR "sleep duration" OR "sleep problem*" OR "sleep hygiene" OR circadian* OR nightmare* OR "sleep deprivation") AND (prison OR prisoner OR imprison* OR inmate OR correctional OR jail OR custody OR offender OR detainee OR incarcerat*).

## Study Selection

Following PRISMA guidelines (Moher et al., 2009), the study selection process is depicted in Figure 1. The search returned 350 unique articles, once 262 duplicates were removed. Studies were screened by title and abstract which removed 317 articles. Full texts were retrieved for the remaining 33 articles where the following inclusion/exclusion criteria were applied: (1) contained an adult prison sample of participants (male and/or female), (2) measured sleep quality or insomnia (i.e. standardised questionnaire such as Pittsburgh Sleep Quality Index (PSQI) or

Insomnia Severity Index (ISI), unstandardised questionnaire, interview or actigraphy), (3) were an unselected general sample (i.e. not groups limited to certain characteristics for example by age or psychiatric disorder) and (4) reported prevalence rates of sleep quality or insomnia. Additionally, studies included in an earlier review (Dewa et al., 2015) were excluded so that this would be an updated review of prevalence of sleep problem within the prison population. A further 22 studies were excluded based on these criteria. Hand-searching of the reference lists and citations of the included studies revealed one additional study which met inclusion criteria.

Screening was conducted by the first author. Full texts were assessed for eligibility by the first author with a randomly selected 10\% (of the 33 articles) counterreviewed independently by the second author. There was full agreement on papers included and excluded.


Figure 1. PRISMA flow diagram of literature search and screening.

## Data Extraction and Analysis

A data extraction table was designed and used to extract relevant data from the twelve included studies. The extracted data included authors, year of publication, location of study, study design, sample size, participant age and gender, details of the prison setting, sampling method (including any exclusion/inclusion criteria), measure of sleep used and its reliability, aim of the study and sleep-related outcomes, and prevalence rate(s).

Assessment of study quality was undertaken during data extraction using guidelines for evaluating prevalence studies (Joanna Briggs Institute, 2014; Munn et al., 2015). Given that there is no single, standardised critical assessment tool for all study designs, a different tool to that used by Dewa et al. (2015) was used given the differing scope of the reviews. A cross-sectional study assessment tool was selected for the current review, which although creates some discrepancy in comparing to the previous review, assessed similar quality areas. Studies were assessed according to sampling (size and approach), response rate, study objectives, data analysis, identification of insomnia and measurement. The quality assessment utilised a standardised form (Munn et al., 2015) and each of the nine domains was given a score; total scores were used to evaluate study quality (7-9 'good' and 4-6 'fair'). Quality assessment and data extraction was completed by the first author and reviewed by the second author at various stages throughout data extraction, with full agreement.

Due to the heterogeneity in the method of measurement of sleep quality/insomnia, it was not appropriate to conduct a meta-analytic estimation of prevalence. A descriptive, narrative approach was used to summarise the key findings.

## Results

## Overview

The literature search identified twelve cross-sectional studies that met the inclusion criteria. Table 1. presents data extracted from each of the twelve studies (one article, see Barker et al., (2016) details two unique studies and is described over two rows).

The table begins with studies measuring insomnia over the first six rows in ascending publication date order, followed by those measuring sleep quality. Overall, using Munn et al.'s (2015) appraisal checklist, the quality of studies was adequate, especially when comparing to Dewa et al.'s (2015) previous review where the quality of reviewed studies varied considerably. Eight studies were rated as 'good' and four were rated as 'fair' (see Table 1). Most studies utilised standardised measures of sleep quality/insomnia ( $\mathrm{n}=10$ ) and had good response rates, with one third reporting sample size calculations. Generally, studies quality rated as 'fair' lacked detail with regards to the setting and sampling methods.

The twelve studies were published between 2014 and 2020. Sample sizes ranged from 95 to 1,491 and participants were aged between 18 and 85 . Response rates were reported by most studies $(\mathrm{n}=9)$ and ranged from $18 \%$ to $99.5 \%$. The samples had diverse countries of origin (i.e., Switzerland ( $n=1$ ), Taiwan ( $n=1$ ), UK ( $n=2$ ), India ( $n=1$ ), Turkey ( $n=1$ ), China ( $n=1$ ), Ethiopia ( $n=2$ ), Pakistan ( $n=1$ ), USA $(n=1)$ and France $(n=1))$. Studies also included male and female participants: nine were solely, or predominantly a male sample, one included a solely female sample and two had a proportionate male to female sample. Most studies ( $\mathrm{n}=7$ ) used voluntary sampling of the prison population (i.e., following screening of inclusion/exclusion criteria), three studies used random sampling, one study used consecutive sampling and in one study the sampling method could not be established.

Table 1. Summary of Key Findings and Prevalence Rates of Studies Included in Review.

| Author, <br> Year, Country \& Quality Rating | Study Design | Participants | Setting \& Sample | Sleep Measure \& Reliability | Main Aim \& Sleep-related Results | Prevalence |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Vogler et al. (2014) | Crosssectional | $\begin{aligned} & \mathrm{N}=49 \\ & \text { males } \end{aligned}$ | Open prison, all male (106 total capacity at time of study) <br> All prisoners screened, 32 excluded based on, language ability, meeting criteria for ICD-10 "mental retardation" or had legal guardian (66\% response rate). 28 (57\%) general prison section, 18 (37\%) privileged section. | Standardised: <br> ISI (translated to German) <br> Reliability $\alpha=.85$ <br> Cut-off score 10 used for subclinical insomnia | Investigation of sleep in relation to anger, ADHD, depression, physical health and life satisfaction. | 33\% subclinical insomnia/poor sleep quality ( $\mathrm{ISI} \geq 10$ ) |
| Switzerland | Selfcompleted | Aged 21-73 (mean 39.37, SD 13.95) |  |  |  |  |
| Good quality | questionnaire |  |  | Unstandardised: Sleep hygiene and sleep duration. | Short and poor sleep was related to anger and more physical health complaints. Poor sleep also related to more rumination and symptoms of ADHD. No sig. difference in sleep between prison sections. | 37\% slept <6 hours a night |
| Dewa et al. (2017) | Crosssectional | $\begin{aligned} & \hline N=237 \\ & \text { (118 male, } \\ & 119 \text { female) } \end{aligned}$ | Two adult male prisons (category B and category C) and one prison for adult females. Total capacity of 3 prisons 2186 at time of study | Standardised: <br> SCI <br> Reliability $\alpha=.89$ | Study of prevalence of insomnia and associated forensic risk factors in | 61.6\% insomnia (DSM-5 criteria using SCI) |
| UK | Questionnaire completed via | Aged 18-72 <br> (mean 36.2, <br> SD 11.9) |  | Score $\leq 16$ possible insomnia | prisoners in England. | 70.6\% females 52.5\% |
| Good quality | interview |  | Random sampling. Excluded those unable to provide informed consent, risks that prevented being interviewed by a lone professional and not English speaking (mean response rate 64\%). Sample size calculated. | PSQI <br> Reliability $\alpha=.89$ <br> Score $\geq 5$ indicated poor <br> sleepers <br> SHI <br> Reliability $\mathrm{r}=.71$ <br> DBAS-16 <br> Reliability $\alpha=.79$ | Higher prevalence of insomnia in prison than in UK general population (using the same measure, SCI). <br> Prisoners with insomnia sig. more likely to have symptoms of anxiety, depression, suicidality and suspiciousness. | males <br> 88.2\% poor sleep quality (PSQI>5) |


| Raha et al. (2018) <br> India | Crosssectional <br> Questionnaire completed via interview | $\mathrm{N}=80(40$ <br> male, 40 <br> female) <br> Mean age <br> 36.74 (SD <br> 10) | Central jail <br> Consecutive sampling, matched for gender at intake. Excluded based on language barriers, diagnosed psychiatric illness, hearing or vision impairments or those with serious medical illness. Sample size calculated. | Standardised: <br> PIRS (also translated to Assamese and Bengali) Reliability stated as 'good' | To compare the prevalence of insomnia, depression and suicidality between male and female inmates. <br> Higher prevalence in female inmates in all defined problems. | 72.5\% insomnia in females 65\% insomnia in males |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  |
| Good quality |  |  |  |  |  |  |
| $\begin{aligned} & \text { Li and Lai } \\ & \text { (2019) } \end{aligned}$ | Crosssectional | $\begin{aligned} & \mathrm{N}=1490 \\ & \text { males } \end{aligned}$ | Prison, total capacity 1595 at time of study (8 female) | Standardised: <br> ISI-C (Chinese version) <br> Reliability $\alpha=.94$ | Study of prevalence and correlates of insomnia in Taiwan prisoners. | $\begin{aligned} & \text { 26.9\% } \\ & \text { insomnia (ISI } \geq 9) \end{aligned}$ |
| Taiwan <br> Good quality | Selfcompleted questionnaire | Aged 21-77 (mean 44.73, SD 10.01) | All prisoners screened excluded pre-trial, those under observation or rehabilitation, females and juveniles (97.99\% response rate) | Cut-off score 9 used for insomnia. | Insomnia prevalence in prison was higher than adult community population. Insomnia was independently related to religious beliefs, anxiety and self-rated health status. |  |
| Acar et al. (2019) | Crosssectional | $\begin{aligned} & \mathrm{N}=399(389 \\ & \text { male, } 10 \\ & \text { female) } \end{aligned}$ | Type M prison (Turkey) male and female | Standardised: <br> ISI (Turkish version) <br> Reliability $\alpha=.79$ | To explore whether PTSD dissociative subtype differentiated with regard to | 37.8\% clinical insomnia (ISI $\geq 15$ ) |
| Turkey <br> Fair quality | Questionnaire completed via interview | Age 18-75 <br> (mean 34.54, SD 9.93) | All prisoners screened. Excluded if less than one month of incarceration. | Cut off score $\geq 15$ PSQI (Turkish version) Reliability not reported. Score $\geq 5$ indicated poor sleepers MEQ (Turkish version) Reliability $\alpha=.81$ | sleep disturbance, circadian preference and posttraumatic cognitions. <br> Insomnia and poor sleep quality were found to be pronounced among prisoners with PTSD irrespective of levels of dissociation. | 70.4\% poor sleep quality (PSQI $\geq 5$ ) |


| Geng et al. (2020) | Crosssectional | $\begin{aligned} & \mathrm{N}=1491 \\ & \text { males } \end{aligned}$ | Maximum security men's prison (total capacity 2358 at time of study). | Unstandardised questionnaire: <br> 6 items to evaluate sleep | To investigate the prevalence and correlates of sleep problems in prison in China. | 26.2\% insomnia symptoms |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| China <br> Good | Questionnaire completed via interview | Age 18-69 (mean 35.44, SD 9.67) | Voluntary sampling. <br> Excluded based on sight | duration, initiation, maintenance, early awakening, daytime | Poor physical health, PTSD and depression, were | 45.9\% poor sleep quality |
| quality |  |  | problems, not completing primary school education, those under observation and serious mental illness (87.3\% response rate of 1708 who met criteria). | dysfunction and quality on a four-point scale (except duration). <br> Insomnia classed in accordance with DSM-5 and ICSD-3 as daytime dysfunction plus initiation, maintenance or early awakening issues. | associated with insomnia and poor sleep quality. Prevalence of insomnia was nearly two times higher than in general Chinese population. | $17.4 \%$ slept $<6$ hours a night |
| Harner and Budescu (2014) | Crosssectional | $\begin{aligned} & \mathrm{N}=438 \\ & \text { females } \end{aligned}$ | Maximum security women's prison (total capacity 1549 at time of study) | Standardised: <br> PSQI <br> Reliability $\alpha=.81$ <br> Scores $\geq 6$ indicated poor <br> sleepers <br> (MAPS <br> Reliability $\alpha=$.70) | To describe incarcerated women's sleep quality and associates including risk for sleep apnea. <br> Poor sleepers scored significantly higher on the risk for sleep apnea scale compared to women who did not meet the poor sleep threshold. Risk for sleep apnea was low overall. | 72\% poor sleep quality (PSQI>5) |
| Good quality | Selfcompleted questionnaire | Age 20-85 (mean 38.29, SD 10.93) | Voluntary sampling. Only included inmates of the prison's 'general population' ( $48 \%$ response rate of 900 invited). |  |  |  |
| Barker et al. (2016) | Crosssectional | $\mathrm{N}=95$ males | UK adult male prison | Standardised: PSQI | Study one explored explicit aggression and implicit | 56\% perceived poor sleep quality |
| (study 1 of 2 reported) | Selfcompleted questionnaire | $\begin{aligned} & 35.25 \text { (SD } \\ & \text { 10.9) } \end{aligned}$ | All prisoners at the prison at time of study approached (37.6\% response rate of 300 invited). | Reliability not stated. Cut off used not stated. | processing in relation to sleep quality and quantity. | Mean PSQI 9.07 (SD 4.4) |
| UK |  |  |  | PSQI question 9 used for analysis measuring | Sleep quantity and quality didn't associate with | $40 \%$ slept <6 hours |
| Fair quality |  |  |  | perceived quality of sleep as good (fairly or very) or bad (fairly or very) | aggression but those perceiving poor sleep quality were more likely to report higher levels of aggression. | a night |


| As above, study 2 of 2 reported | Crosssectional <br> Selfcompleted questionnaire | $\mathrm{N}=141 \mathrm{males}$ <br> Mean age 19.15 (SD 1.24) | UK young adult male prison <br> All prisoners at the prison at time of study approached ( $18 \%$ response rate of 500 invited). | As above | Study two extended the aggression variables to address hostile attribution, prosocial attribution and aggression motivation. <br> Poor sleep quality was associated with lower prosocial attribution tendencies and higher aggression. Those perceiving poor sleep were also more likely to report higher levels of aggression. | 61.7\% perceived poor sleep quality <br> Mean PSQI 9.80 (SD 4.1) <br> $36.9 \%$ slept <6 hours a night |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Goudard et <br> al. (2017) | Crosssectional | $\begin{aligned} & \mathrm{N}=358(319 \\ & \text { male, } 39 \\ & \text { female) } \end{aligned}$ | Total capacity of prison 690 adults ( 60 for females) | Unstandardised: Bespoke questionnaire relating to sleep | To define the therapeutic profile of inmates treated for insomnia. | 56\% dissatisfied with sleep (21\% 'bad' 35\% |
| France <br> Fair quality | Selfcompleted questionnaire | Age not stated | All prisoners invited. Excluded recent arrivals ( $56 \%$ response rate of 664 invited). | satisfaction, duration, sleep hygiene, insomnia symptoms and hypnotic treatment. | Most common symptom of insomnia was several awakenings at night, and most frequent reported aetiologies were rumination and noise. Most reported that sleeping problems began/worsened after incarceration. A quarter of inmates were taking hypnotic treatment, and most began treatment in prison. | 'quite bad') <br> Approx. 35\% slept $<5$ hours a night |
| Ishfaq and Kamal (2019) | Crosssectional <br> Questionnaire | $\begin{aligned} & \mathrm{N}=362(349 \\ & \text { male, } 13 \\ & \text { female) } \end{aligned}$ | Two central prisons <br> Sampling not stated. 182 prisoners from one prison | Standardised: <br> DSM-5 CCSM (translated <br> to Urdu) <br> Reliability $\alpha=.89$ | To translate CCSM and measure comorbid psychiatric symptomology among prisoners. | 42.8\% sleep problems |
| Pakistan <br> Fair quality | self- <br> completed or with assistance from literacy teacher | Age 19-70 (mean 34.9, SD 10.11) | and 180 from the other | 1 item for sleep disturbance (23 total items) using a five-point rating scale. Scores $\geq 2$ indicates clinically relevant symptom. | Sleep problem was the most reported symptom at the severe end of the scale (score 4 , reported on a daily basis). |  |


| Getachew et al. (2020) | Crosssectional | $\mathrm{N}=421$ <br> (393 male, <br> 28 female) | Contained prisoners who were sentenced and awaiting court decision (total capacity | Standardised: <br> PSQI <br> Reliability not stated. | To determine the prevalence of poor sleep quality and associated factors among | 62.5\% poor sleep quality (PSQI>5) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Ethiopia | Questionnaire overseen by data collectors | Age 18-72 (mean 31.35, SD 10.33) | 1500 at time of study) | Score >5 indicated poor sleepers | prisoners. |  |
| Good quality |  |  | Random sampling. Excluded those awaiting court decision, with diagnosed psychiatric disorder, those in isolation and with chronic physical illness (99.5\% response rate of 423 invited). Sample size calculated. | SHI <br> Reliability stated as 'acceptable' | More than half of the participants had poor sleep quality. Depression, poor sleep hygiene and certain crime types were associated with poor sleep. |  |
| Abdu and Hajure (2020) | Crosssectional | $\begin{aligned} & \mathrm{N}=310(265 \\ & \text { male, } 45 \\ & \text { female }) \end{aligned}$ | Total capacity 1111 at time of study | Standardised: <br> PSQI (questionnaire translated to local language by independent reviewer) <br> Reliability not stated. Score $\geq 5$ indicated poor sleepers | To assess the prevalence and associated factors of poor quality of sleep among prisoners. | 77.1\% poor sleep quality (PSQI $\geq 5$ ) |
| Ethiopia | Questionnaire completed via | Median age | Systematic random sampling. Excluded seriously ill inmates ( $98.7 \%$ response rate of 314 invited). Sample size calculated. |  |  |  |
| Good quality |  | 30 (IQR 10) |  |  | Marital status, history of incarceration, residence, illiteracy and lifetime alcohol use had an impact on the prevalence of poor sleep quality. |  |

Abbreviations: Standard Deviation (SD); International Classification of Diseases version 10 (ICD-10); Insomnia Severity Index (ISI); Attentional Deficit Hyperactivity Disorder (ADHD); Sleep Condition Indicator (SCI); Pittsburgh Sleep Quality Index (PSQI); Sleep Hygiene Index (SHI); Dysfunctional Beliefs and Attitudes about Sleep (DBAS-16); Pittsburgh Insomnia Rating Scale (PIRS); Morningness-Eveningness Questionnaire (MEQ); Post-Traumatic Stress Disorder (PTSD); Diagnostic and Statistical Manual of Mental Disorders 5th Edition (DSM-5); International Classification of Sleep Disorders third edition (ICSD-3); Multivariable Apnea Prediction Score (MAPS); Cross-Cutting Symptoms Measure (CCSM); and Interquartile Range (IQR).

## Sleep Quality Measure

All studies measured sleep quality through self-report questionnaire. Seven studies utilised an intermediary to assist with the questionnaire completion. The most common method $(\mathrm{n}=5)$ comprised interviewing the participant with the questionnaire; with other studies ( $\mathrm{n}=2$ ) questionnaire completion was overseen by a literacy teacher and a data collector. Five studies had participants complete the questionnaire independently.

The majority of studies $(\mathrm{n}=10)$ employed standardised measures. Five studies measured insomnia using standardised questionnaires; three used the Insomnia Severity Index (ISI) (Acar et al., 2019; Li \& Lai., 2019; Vogler et al., 2014), one used the Sleep Condition Indicator (SCI) (Dewa et al., 2017) and one used Pittsburgh Insomnia Rating Scale (PIRS) (Raha et al., 2018). Six studies utilised the Pittsburgh Sleep Quality Index (PSQI) to measure sleep quality (Abdu \& Hajure, 2020; Acar et al., 2019; Barker et al., 2016; Dewa et al., 2017; Getachew et al., 2020; Harner \& Budescu, 2014). Barker et al. (2016) used the specific perceived sleep quality item from within the PSQI, where perception was a particular interest of the study. Other standardised measures were used to capture other various sleep factors including the Sleep Hygiene Index and the Morningness-Eveningness Questionnaire. The use of an unstandardised measure was less common with only two studies using unstandardised measures as their only measure: Geng et al. (2020) designed questions based on DSM-5 and ICSD-3 criteria for insomnia in order to measure prevalence of insomnia, and Goudard et al. (2017) designed questions to measure sleep satisfaction in their participants.

There were some discrepancies in how individual studies chose to interpret standardised measures. Studies using the ISI varied in the score thresholds used for determining insomnia, Li and Lai (2019) used a cut off score of $I S I \geq 9$, Vogler et al. (2014) used $\mid S I \geq 10$ and Acar et al. (2019) used $\mid S I \geq 15$. This highlights how the detection of insomnia was more conservative in the latter than the former studies. However, it is interesting to note that Acar et al. (2019) reported the highest prevalence of insomnia in this subsection of studies, followed by Vogler et al. (2014) and then Li and Lai (2019). According to the measure, $\mathrm{ISI} \geq 15$ would distinguish 'clinical insomnia', whereas $\geq 10$ and $\geq 9$ are part way in the 'subthreshold' range of scores of 8-14 (Morin et al., 2011).

There was further inconsistency in the use of PSQI score thresholds with Dewa et al. (2017), Getachew et al. (2020) and Harner and Budescu_(2014) using the suggested PSQI>5 for distinguishing poor sleep. However, Abdu and Hajure (2020) and Acar et al. (2019) used PSQI $\geq 5$. Barker et al. (2016) did not describe the threshold used for PSQI nor did they report the prevalence of poor sleep measured by the PSQI global score. This, again, means that Abdu and Hajure (2020) and Acar et al. (2019) overestimated the prevalence of poor sleep quality by including a score of 5 as poor rather than good quality sleep (Backhaus et al., 2002).

Ishfaq and Kamal (2019) measured sleep problems (amongst other psychiatric symptomology) with the 23 -item DSM-5 CCSM, and the prevalence of sleep problem was estimated from one question and should be evaluated with caution due to this crude measurement.

## Prevalence

The quality of previous estimates of prevalence of insomnia and/or sleep problems in prison populations has often been hindered by the measurement being a by-product of other study aims (Dewa et al., 2015). The main aim of eight of the studies included in the current review was to measure the prevalence of sleep problems in the prison setting and four measured sleep factors in order to investigate correlates with other comorbidities (e.g., psychiatric disorders, anger and ADHD).

## i. Insomnia Prevalence

The first six rows of Table 1. show studies including reported prevalence of insomnia specifically. Estimated prevalence of insomnia varied, with rates ranging from 26.2\% to $72.5 \%$. Examination of the study characteristics in greater detail offers explanations as to the considerable heterogeneity in these prevalence rates. The sample sizes of the six studies reporting insomnia prevalence varies considerably (49 to 1,491 participants). Interestingly, the two studies with the largest samples (1490 and 1,491 participants_Geng et al. 2020; Li \& Lai, 2019) report the lowest prevalence, suggesting a magnified prevalence in smaller studies. However, Vogler et al. (2014) had the smallest sample size $(\mathrm{n}=49)$ and reported the third lowest prevalence rate (33\%). Whilst five of these six studies have used standardised measurements, the differences in measurement and cut-off for insomnia using ISI stated previously fundamentally undermine any meaningful comparison between the reported prevalence rates. Furthermore, Geng et al. (2020) who had one of the largest samples but smallest prevalence, used an unstandardised measure which although was designed according to insomnia diagnostic criteria, has not been tested for its construct-validity.

A further consideration relates to gender difference: two of the six studies included a representative female sample. When gender difference is taken into account, the male prevalence of insomnia is estimated between $26.2 \%$ to $65 \%$ and the female prevalence of insomnia is estimated between $70.6 \%$ to $72.5 \%$. This difference is stark and although the comparison in gender prevalence is very limited due to a small comparison sample of females and possibility of over-estimation, it does generate an important narrative in support of known gender differences in insomnia.

## ii. Poor Sleep Quality Prevalence

Table 1. shows nine studies reporting prevalence of poor sleep quality. Estimated prevalence of poor sleep quality varied, with reported rates ranging from $42.8 \%$ to $88.2 \%$. Further examination offers explanations as to the heterogeneity in these prevalence rates. Poor sleep quality is perhaps a more common and subjective concept to measure than insomnia, so higher incidence and greater variation might be expected. Interestingly, the four studies that reported the lowest prevalence of poor sleep quality used unstandardised or very simplistic measures (Barker et al., 2016; Geng et al., 2020; Goudard et al., 2017; Ishfaq \& Kamal, 2019). This suggests an underestimate of prevalence when compared to more reliable measures.

When the five studies utilising PSQI are considered, the same fundamental flaw remains with differing measurement cut-offs, which undermines meaningful comparison. When we examine the prevalence according to the cut-off used, however, the three studies using the recommended PSQl>5 prevalence have a range from 62.5\% to 88.2\% (Dewa et al., 2017a; Getachew et al., 2020; Harner \& Budescu, 2014); and the two using the over-estimated PSQI $\geq 5$ reported prevalence
is actually within the above range at $70.4 \%$ to $77.1 \%$ (Abdu \& Hajure, 2020; Acar et al., 2019). Similarly to insomnia prevalence, samples sizes varied between studies and had predominantly male samples.

## iii. Short Sleep Duration

Four studies reported short sleep duration (Barker et al., 2016; Geng et al., 2020; Goudard et al., 2017; Vogler et al., 2014). The reported prevalence of less than six hours of sleep a night were $17.4 \%$ to $40 \%$ and Goudard et al. (2017) reported approximately $35 \%$ had less than five hours sleep a night. Barker et al. (2016) reported that their findings supported the notion that sleep quality as opposed to sleep quantity is more important with regard to predicting aggressive behaviour. iv. General Population Comparisons

Some studies commented on how their prevalence rates compared to the reporting country's general population estimate (Abdu \& Hajure, 2020; Dewa et al., 2017a; Geng et al., 2020; Goudard et al., 2017; Li \& Lai, 2019). All studies reported a higher prevalence of poor sleep in the prison population than the general population, with slightly differing prevalence rates between the countries. For example, estimates of insomnia prevalence are reported to be smaller in China (Cao et al., 2017; Geng et al., 2020) than in the UK (Dewa et al., 2017; Espie et al., 2012). Variable measurement is seen as a significant problem in estimating insomnia prevalence (Cao et al., 2017; Dewa et al., 2015). Dewa et al. (2017) was the only study to report the comparative general population estimate measured using the same insomnia questionnaire as their study. Table 2. displays an approximate comparison of prevalence of poor sleep factors in prison and general populations.

Table 2. Current Review Prevalence Rates Compared to General Population Estimates.

|  | Prison Prevalence Rates of <br> Reviewed Studies Using <br> Standardised Measures | General Population Estimates <br> of Prevalence |
| :--- | :---: | :---: |
| Insomnia Prevalence | $26.9-72.5 \%$ | $6-30 \%^{1,2}$ |
| Poor Sleep Quality | $62.5-88.2 \%$ | $25-36 \%^{1,3}$ |
| Prevalence <br> $<6$ Hours of Sleep <br> Duration per Night | $17.4-40 \%$ | $11-29.9 \%^{4,5}$ |

References: ${ }^{1}\left(\right.$ Morin \& Benca, 2012) ${ }^{2}(\text { Roth, 2007 })^{3}(\text { Hinz et al., 2017 })^{4}(\text { Bin et al., 2013 })^{5}($ Luckhaupt et al., 2010)

## v. Comorbidities

Some studies measured correlates of poor sleep including aggression, drug or alcohol use, anxiety, depression, suicidality, PTSD, ADHD and physical health. Barker et al. (2016) reported an association between poor sleep and higher aggression and Vogler et al..(2014) also reported this association with aggression with the additional correlate of higher ADHD symptomology with poor sleep. Abdu and Hajure (2020), Dewa et al. (2017) and Getachew et al. (2020) found associations between certain drug or alcohol abuse histories and poor sleep quality. Li and Lai (2019) reported that anxiety was an independent predictor of insomnia. Dewa et al. (2017) reported that those prisoners with insomnia were more likely to report symptoms of anxiety, depression and suicidality. Acar et al. (2019) and Harner and Budescu (2014) found that insomnia and poor sleep quality were higher in those with PTSD. Dewa et al. (2017), Geng et al. (2020) and Li and Lai (2019) reported positive correlations between insomnia/poor sleep quality and poor physical health status.

Some studies measured and reported on other demographic correlates as well as prison environmental factors. Demographic correlates included a negative correlation between sleep duration and older age (Geng et al., 2020), a negative correlation with poor sleep quality and education level (Abdu \& Hajure, 2020), a positive correlation between insomnia and having religious beliefs (Li \& Lai, 2019), a positive correlation between poor sleep quality and previous criminal activity or incarceration (Abdu \& Hajure, 2020; Ishfaq \& Kamal, 2019) and a higher insomnia prevalence in those who were divorced or widowed (Geng et al., 2020).

Dewa et al. (2017) not only alluded to environmental factors impacting sleep within prison, as other studies did, but they also measured it within their study, developing a Prison Environment Sleep Questionnaire. They reported that those with insomnia had significantly higher reports of environmental disturbances including noise, temperature, light and mattress discomfort. Similarly, Goudard et al. (2017) also measured environmental factors within their questionnaire, with $66 \%$ of poor sleepers (and $37 \%$ of good sleepers) complaining of noise pollution, and $40 \%$ of poor sleepers (and 21\% of good sleepers) reporting discomfort with temperature. Harner and Budescu (2014) took qualitative data from the PSQI to report on additional factors affecting sleep: 40\% of their female sample disclosed problems including environmental noise and bed discomfort being a problem three or more times a week. Additionally, these three studies also referenced ruminating thoughts affecting sleep for a large proportion of participants, likely to be associated with poor mental health.

## Discussion

The current systematic review identified twelve cross-sectional studies reporting on prevalence of insomnia or poor sleep quality using self-report measures within adult prisoners. Results showed that research measuring sleep quality within prisons has increased over recent years, and that the estimated prevalence rates of sleep problems in prisons is variable. Whilst improvement in the consistency of measurement of sleep factors through increased use of standardised tools was shown, there remains discrepancy in the parameters used within measurement tools (e.g., ISI and PSQI). This critically undermines comparison of estimated prevalence rates and needs to be consistently agreed for the field to progress. Furthermore, the studies varied methodologically on quality, sampling (size and method) and administration of self-report questionnaires, which probably also impacted on the variability of prevalence rates.

Within six reviewed studies measuring insomnia, prevalence rates ranged from $\mathbf{2 6 . 2 \%}$ to $72.5 \%$. There was a gender difference observed as two of the six studies had a representative female sample: females accounted for the highest prevalence rates of insomnia ( $70.6 \%$ to $72.5 \%$ ) whereas male (or predominantly male) prevalence rates were $26.2 \%$ to $65 \%$. There was discrepancy in the measurement used, the cut-off to determine insomnia (on the ISI) and the sample size, which caused concern for the credibility of the rates.

Within the nine studies measuring poor sleep quality, prevalence rates ranged from $42.8 \%$ to $88.2 \%$. There was some variability in measurement used, which raised questions on reliability. Five studies used PSQI to report the prevalence of poor sleep with rates between $62.5 \%$ to $88.2 \%$. However, there again was variability
in the cut-off used to determine poor sleep with the possibility of over-estimating the prevalence of poor sleep for two studies. Conversely, the prevalence rates did not reflect this, but this incongruity does call to question the accuracy of the reported prevalence rates. Four studies also recorded and reported on short sleep duration (<6 hours sleep per night), with prevalence rates between $17.4 \%$ and $40 \%$. All prison population sleep-related prevalence rates were higher than general population estimates (e.g., Morin \& Benca, 2012).

Dewa et al.'s_(2015) previous integrative review reported a varied prevalence of insomnia within prison populations with rates of $10.9 \%$ to $81 \%$ from twelve studies between 1974 and 2012. However, none of the reviewed studies used a recommended standardised measure to assess insomnia by diagnostic criteria (e.g., clinical interview, ISI or SCI). Therefore, the current review offers confidence that the prevalence rate (of between $26.2 \%$ and $72.5 \%$ ) is likely to be more accurate.

Elger's (2007) scoping review concluded that insomnia in prisons more likely to be a primary problem rather than secondary one to other conditions. Indeed, Goudard et al..(2017) reported in their study that 57\% of poor sleepers' difficulties had begun in prison whilst $31 \%$ already had sleep problems that became worse in prison, suggesting a variety of possible causes and interactions. Although not a specific aim of this review, comorbidities of sleep problems have been noted within the reviewed studies. Studies included many correlates of sleep problems including mental health condition, physical health and demographics. The incidence of psychiatric disorder within prison populations is known to be high (Fazel \& Danesh, 2002) and it is likely to impact wellbeing, including sleep quality. However, some of the studies in this review excluded participants based on their psychiatric diagnosis
(Geng et al., 2020; Getachew et al., 2020; Raha et al., 2018). This may have implications for the validity of reported prevalence rates of sleep problems, with a probable underestimation. Clearly the relationship between sleep and mental health is a complex one with particular difficulties in measurement and in determining cause and effect. The importance of sleep, however, within the picture of mental health is vital given the well-established association between insomnia, depression and suicide (Dewa et al., 2017a).

None of the studies in this review used recommended objective sleep measures, such as actigraphy or polysomnography: this was seemingly due to the barriers of using such measures within prison settings (Barker et al., 2016). The use of self-report does cause some doubts in regard to subjectivity: self-report sleep measures do not always correspond with objective ones (Girschik et al., 2012). However more than half of the studies $(n=7)$ utilised a mediator to assist with questionnaire completion. This method reduces the risk of misunderstanding, data omission and can also increase uptake due to rapport building when conducting research in prison settings (Sutton, 2011).

Studies included within this review represent a variety of countries and these differences must be considered. Cultural difference may explain some variance in prevalence of insomnia/poor sleep quality. It has been reported that the prevalence of insomnia is lower in China and other Asian countries when compared to Western countries (Cao et al., 2017; Zhang \& Wing, 2006). These differences could be attributable to a myriad of factors including lifestyle, values and socioeconomics. Younger adults appear to report higher levels of insomnia in China whereas the trend is for insomnia to more commonly be associated with older age in other
populations. Again, this could be attributable to many things, for instance the use of technology and its negative effect on sleep hygiene (Cao et al., 2017).

Differences in prison settings between countries must also be considered, particularly with regard to environmental factors. Comment on specific differences is outside the scope and purpose of this review however, generally, there will be variation in prison conditions relating to the criminal justice system, level of security and practices, prison capacity and facilities. Such differences will likely have a direct impact on the opportunity for quality sleep (Abdu \& Hajure, 2020). Included studies reported on external environmental factors impacting on sleep, such as overcrowding, prison officer rounds, bed comfort, temperature, light and noise (Dewa et al.,_2017; Goudard et al., 2017; Harner \& Budescu, 2014). The internal cognitive and emotional process of incarceration was mentioned in some studies and its impact on sleep, for instance the feelings of guilt, rumination, anxiety, fear of violence and isolation (Getachew et al., 2020; Harner \& Budescu, 2014; Raha et al., 2018). Such findings on internal and external factors affecting sleep can offer insights for interventions for improving sleep quality such as Cognitive Behaviour Therapy for Insomnia (Dewa et al., 2017b) and more general environmental solutions like earplugs (Goudard et al., 2017).

In addition to the methodological considerations already discussed, there are several further limitations of the included studies. Given the nature of the review, all studies were cross-sectional and cannot support conclusions on causality. The sample sizes varied considerably, with some reporting very small samples which is problematic when inferring prevalence. Sampling methods also varied: some studies reported response rates which were overall quite positive, however largely opt-in
sampling methods may have created some bias alongside the differing exclusion criteria between studies. Generalisability of the results will be difficult given the specific parameters of the study question (i.e., the results are limited to each prison the study was conducted in and the samples are heavily weighted towards males, as is the case throughout prison populations). This raises further caution to generalisability of gender differences.

There are some limitations to this review. There was a relatively small number of studies included and these were split between reporting the prevalence of insomnia versus poor sleep quality. The exclusion criteria used in this review narrowed the opportunity to review more studies (i.e., non-English articles, abstracts). The small publication timeframe of studies searched also impacted on the identified number of studies reviewed. Heterogeneity of these studies alongside the small number measuring and reporting on insomnia specifically, prevented a metaanalysis. Nevertheless, the current review has demonstrated an improvement in recent years in regards to research activity and study quality: the result is that we can be more confident that there is a slightly narrower range of prevalence estimates. Longitudinal studies would increase the understanding of the aetiology of insomnia and help in the development and priority afforded to interventions in prisons. Furthermore, independent investigation of male and female insomnia in prisons would clarify gender differences further as this difference appears to be meaningful and particularly pronounced in prison populations (Dewa et al., 2017a; Harner \& Budescu, 2014; Raha et al., 2018).

## Conclusion

The prevalence of poor sleep quality and insomnia within the prison population is variable and above the general population average. There are a myriad of known factors influencing sleep problems including mental health difficulties, poor physical health and prison environmental factors. This review has highlighted that research over the past decade has increased in measuring the sleep of prisoners, with a rise in utilising validated measures. This is an important step due to the negative emotional and physical implications of inadequate sleep quality and quantity. Future epidemiological studies should seek to measure insomnia in accordance with diagnostic criteria, objectively and longitudinally where possible, and/or use recommended and consistent parameters on validated self-report measures. Ultimately, the high prevalence of substandard sleep within prisons should be recognised as a priority to screen and treat routinely.

## References

Abdu, Z., \& Hajure, M. (2020). Prevalence and Associated Factors of Poor Quality of Sleep among Prisoners in Mettu Town Prison, Oromia, South West Ethiopia, 2019. The Open Public Health Journal, 13(1).
https://doi.org/10.2174/1874944502013010094
Acar, Ö. F., Öğülmüş, S., \& Boysan, M. (2019). Associations between circadian preferences, sleep quality, dissociation, post-traumatic cognitions, and posttraumatic stress disorder (PTSD) among incarcerated offenders. Sleep and Hypnosis, 21(3), 201-219. APA PsycInfo®.

American Academy of Sleep Medicine. (2014). International classification of sleep disorders (3rd ed.). Author.

American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (5th ed.). Author. https://doi.org/10.1176/appi.books. 9780890425596

Backhaus, J., Junghanns, K., Broocks, A., Riemann, D., \& Hohagen, F. (2002). Test-retest reliability and validity of the Pittsburgh Sleep Quality Index in primary insomnia. Journal of Psychosomatic Research, 53(3), 737-740. https://doi.org/10.1016/S0022-3999(02)00330-6

Barker, L. F., Ireland, J. L., Chu, S., \& Ireland, C. A. (2016). Sleep and its association with aggression among prisoners: Quantity or quality? International Journal of Law and Psychiatry, 47, 115-121. APA PsycInfo®. https://doi.org/10.1016/j.ijlp.2016.02.014

Bastien, C. (2001). Validation of the Insomnia Severity Index as an outcome measure for insomnia research. Sleep Medicine, 2(4), 297-307. https://doi.org/10.1016/S1389-9457(00)00065-4

Bin, Y. S., Marshall, N. S., \& Glozier, N. (2013). Sleeping at the Limits: The Changing Prevalence of Short and Long Sleep Durations in 10 Countries. American Journal of Epidemiology, 177(8), 826-833. https://doi.org/10.1093/aje/kws308

Bos, S., \& Macedo, A. (2019). Literature review on Insomnia (2010-2016). Biological Rhythm Research, 50, 1-70. https://doi.org/10.1080/09291016.2017.1413766

Buysse, D. J., Reynolds C. F, Monk, T. H., Berman S. R, \& Kupfer D. J. (1989). The Pittsburgh Sleep Quality Index (PSQI): A new instrument for psychiatric research and practice. Psychiatry Research, 28, 193-213.

Cao, X.-L., Wang, S.-B., Zhong, B.-L., Zhang, L., Ungvari, G. S., Ng, C. H., Li, L., Chiu, H. F. K., Lok, G. K. I., Lu, J.-P., Jia, F.-J., \& Xiang, Y.-T. (2017). The prevalence of insomnia in the general population in China: A meta-analysis. PLOS ONE, 12(2), e0170772. https://doi.org/10.1371/journal.pone. 0170772

Dewa, L. H., Hassan, L., Shaw, J. J., \& Senior, J. (2017a). Trouble sleeping inside: A cross-sectional study of the prevalence and associated risk factors of insomnia in adult prison populations in England. Sleep Medicine, 32, 129136. APA PsycInfo®. https://doi.org/10.1016/j.sleep.2016.12.018

Dewa, L. H., Hassan, L., Shaw, J. J., \& Senior, J. (2017b). Insomnia management in prisons in England and Wales: A mixed-methods study. Journal of Sleep Research, 26(3), 322-329. APA PsycInfo®. https://doi.org/10.1111/jsr. 12503

Dewa, L. H., Kyle, S. D., Hassan, L., Shaw, J., \& Senior, J. (2015). Prevalence, associated factors and management of insomnia in prison populations: An integrative review. Sleep Medicine Reviews, 24, 13-27.
https://doi.org/10.1016/j.smrv.2014.12.002
Elger, B. S. (2007). Insomnia in places of detention: A review of the most recent research findings. Medicine, Science and the Law, 47(3), 191-199.
https://doi.org/10.1258/rsmmsl.47.3.191
Espie, C. A., Kyle, S. D., Hames, P., Cyhlarova, E., \& Benzeval, M. (2012). The daytime impact of DSM-5 insomnia disorder: Comparative analysis of insomnia subtypes from the Great British Sleep Survey. The Journal of Clinical Psychiatry, 73(12), e1478-1484. https://doi.org/10.4088/JCP.12m07954

Fazel, S., \& Danesh, J. (2002). Serious mental disorder in 23000 prisoners: A systematic review of 62 surveys. Lancet (London, England), 359(9306), 545550. https://doi.org/10.1016/S0140-6736(02)07740-1

Geng, F., Wang, J., Wen, C., Shao, Y., Wu, J., \& Fan, F. (2020). Prevalence and correlates of sleep problems among Chinese prisoners. Social Psychiatry and Psychiatric Epidemiology. cmedm. https://doi.org/10.1007/s00127-020-018820

Getachew, Y., Azale, T., \& Necho, M. (2020). Poor sleep quality and associated factors among prisoners of the Diredawa correctional facility in eastern Ethiopia. Annals of General Psychiatry, 19(1), 1-9. rzh. https://doi.org/10.1186/s12991-020-00291-6

Girschik, J., Fritschi, L., Heyworth, J., \& Waters, F. (2012). Validation of SelfReported Sleep Against Actigraphy. Journal of Epidemiology, 22(5), 462-468. https://doi.org/10.2188/jea.JE20120012

Goudard, A., Lalande, L., Bertin, C., Sautereau, M., Le Borgne, M., \& Cabelguenne, D. (2017). Sleep disorders and therapeutic management: A survey in a French population of prisoners. Journal of Correctional Health Care, 23(2), 193-202. APA PsycInfo®. https://doi.org/10.1177/1078345817700163

Harner, H. M., \& Budescu, M. (2014). Sleep quality and risk for sleep apnea in incarcerated women. Nursing Research, 63(3), 158-169. APA PsycInfo®. https://doi.org/10.1097/NNR. 0000000000000031

Hinz, A., Glaesmer, H., Brähler, E., Löffler, M., Engel, C., Enzenbach, C., Hegerl, U., \& Sander, C. (2017). Sleep quality in the general population: Psychometric properties of the Pittsburgh Sleep Quality Index, derived from a German community sample of 9284 people. Sleep Medicine, 30, 57-63. https://doi.org/10.1016/j.sleep.2016.03.008

Ishfaq, N., \& Kamal, A. (2019). Mental health and imprisonment: Measuring crosscutting symptoms among convicts in Punjab, Pakistan. Asian Journal of Psychiatry, 44, 127-132. APA PsycInfo®. https://doi.org/10.1016/j.ajp.2019.07.036

Joanna Briggs Institute. (2014). Reviewer's Manual. www.joannabriggs.org Li, M., \& Lai, H. (2019). Insomnia and its associated factors in incarcerated adults: A cross-sectional study. Nursing \& Health Sciences, 21(3), 330-335. APA PsycInfo®. https://doi.org/10.1111/nhs. 12600

Luckhaupt, S. E., Tak, S., \& Calvert, G. M. (2010). The Prevalence of Short Sleep Duration by Industry and Occupation in the National Health Interview Survey. Sleep, 33(2), 149-159. https://doi.org/10.1093/sleep/33.2.149

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., \& for the PRISMA Group. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. BMJ, 339(jul21 1), b2535-b2535. https://doi.org/10.1136/bmj.b2535

Morin, C. M., Belleville, G., Bélanger, L., \& Ivers, H. (2011). The Insomnia Severity Index: Psychometric Indicators to Detect Insomnia Cases and Evaluate Treatment Response. Sleep, 34(5), 601-608.

Morin, C. M., \& Benca, R. (2012). Chronic insomnia. The Lancet, 379(9821), 11291141. https://doi.org/10.1016/S0140-6736(11)60750-2

Munn, Z., Moola, S., Lisy, K., Riitano, D., \& Tufanaru, C. (2015). Methodological guidance for systematic reviews of observational epidemiological studies reporting prevalence and cumulative incidence data. International Journal of Evidence-Based Healthcare, 13(3), 147-153. https://doi.org/10.1097/XEB. 0000000000000054

National Sleep Foundation. (2020a). Diagnosing Insomnia. https://www.sleepfoundation.org/insomnia/diagnosis

National Sleep Foundation. (2020b). How Much Sleep Do We Really Need? https://www.sleepfoundation.org/how-sleep-works/how-much-sleep-do-we-really-need

Raha, B., Sarma, S., \& Phookun, H. R. (2018). A cross-sectional comparative study of insomnia, depression, and suicidality between male and female prisoners
of Guwahati Central Jail. Open Journal of Psychiatry \& Allied Sciences, 9(2), 136. https://doi.org/10.5958/2394-2061.2018.00027.7

Riemann, D., Baglioni, C., Bassetti, C., Bjorvatn, B., Groselj, L. D., Ellis, J. G., Espie, C. A., Garcia-Borreguero, D., Gjerstad, M., Gonçalves, M., Hertenstein, E., Jansson-Fröjmark, M., Jennum, P. J., Leger, D., Nissen, C., Parrino, L., Paunio, T., Pevernagie, D., Verbraecken, J., ... Spiegelhalder, K. (2017). European guideline for the diagnosis and treatment of insomnia. Journal of Sleep Research, 26(6), 675-700. https://doi.org/10.1111/jsr. 12594

Roth, T. (2007). Insomnia: Definition, Prevalence, Etiology, and Consequences. Journal of Clinical Sleep Medicine : JCSM: Official Publication of the American Academy of Sleep Medicine, 3(5 Suppl), S7-S10.

Sutton, J. (2011). An Ethnographic Account of Doing Survey Research in Prison: Descriptions, Reflections, and Suggestions from the Field.

Vogler, N., Perkinson-Gloor, N., Brand, S., Grob, A., \& Lemola, S. (2014). Sleep, aggression, and psychosocial adjustment in male prisoners. Swiss Journal of Psychology, 73(3), 167-176. APA PsycInfo®. https://doi.org/10.1024/14210185/a000137

Zhang, B., \& Wing, Y.-K. (2006). Sex Differences in Insomnia: A Meta-Analysis. Sleep, 29(1), 85-93. https://doi.org/10.1093/sleep/29.1.85

## Chapter 2

Empirical Study

# Exploring the Sleep Quality of People in Recovery from Substance Addiction: A Cross-Sectional Survey Study 

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#### Abstract

Background: Poor sleep quality is known to be associated with alcohol and substance dependence. Abstinence is seen as the best way to improve sleep, initially. However, even those in long-term recovery can continue to experience difficulties with sleep as well as mood. This study aimed to explore sleep quality and the wellbeing of people in recovery alongside a comparison group of people who have not ever had alcohol or substance dependence.

Method: Fifty-nine participants in recovery from substance addiction were recruited from third-sector recovery organisations. Fifty-seven comparison group participants were recruited in a bid to match on socio-demographics. Participants took part in a survey of self-report measures on sleep quality, anxiety, depression and quality of life.

Results: Hierarchical multiple regression revealed that being in recovery as opposed to the comparison group significantly predicted poor sleep quality. However, anxiety was found to be the biggest predictor of poor sleep, regardless of group participation. The recovery group reported significantly poorer levels of anxiety, depression and quality of life than the comparison group.

Discussion: Sleep disturbance and fluctuation in mood is common during recovery. Sleep intervention during recovery should be as routine as support with anxiety and depression given the interconnectedness and links to the risk of relapse. Limitations of the current study and implications for future research and clinical practice are discussed.


Keywords: Recovery, abstinence, alcohol, substances, sleep quality, anxiety.

## Introduction

Sleep disruption is a feature in the vast majority of conditions affecting mental health (Teplin et al., 2006). The link between sleep disruption and alcohol and substance use is also well known; psychoactive substances can have acute and chronic effects on sleep architecture (Teplin et al., 2006). Many of the brain systems involved in the sleep-wake cycle are affected by alcohol consumption (Koob \& Colrain, 2020). High prevalence of sleep problems have been reported in those dependant on substances. Foster and Peters (1999). reported that alcohol dependent participants had significantly poorer sleep than controls. Other studies reported that sleep disturbance upon admission to detoxification services is between 61 and $70 \%$ (Angarita et al., 2016; Brower et al., 2001). Sleep disruption can be experienced in many ways (i.e., difficultly falling asleep, difficulty maintaining sleep and hypersomnia), all of which can, in turn, impact daytime functioning (Teplin et al., 2006).

Despite the evidence that substance dependence can be involved in causing sleep disturbance, the link is known to be bidirectional (Angarita et al., 2016). Of importance is the fact that substances, particularly alcohol, are often used to selfmedicate sleep problems, which can then lead to addiction. Indeed, alcohol generally reduces sleep latency in non-dependent individuals (Angarita et al., 2016), however, it can negatively impact sleep in other ways. Brower et al. (2001) found that nearly half of their sample ( $\mathrm{n}=172$ ) with existing insomnia used alcohol to aid sleep. Neale et al. (2019). reported that participants in their study believed that cannabis and alcohol improved and facilitated their sleep, without insight to the contrary.

Regardless of causation, abstinence is seen as the best strategy to improve sleep (Brower et al., 2011). Biologically, withdrawal will likely cause an initial worsening of sleep through chemical imbalance: prolonged recovery should restore sleep processes, however, dependence can also cause irreversible changes (Koob \& Colrain, 2020). Rates of poor sleep within early recovery (up to two months) have been reported at around 65-88\% (Kolla et al., 2014, 2020). Brower et al. (2011) found that abstinence improved insomnia for most of their sample ( $n=267$ ), however, one quarter had persistent insomnia despite prolonged abstinence from alcohol. In their review, Angarita et al. (2016) found that even in maintained abstinence (i.e., of more than two months), sleep disruption including extended sleep latency and short sleep duration was still evident following withdrawal from alcohol, cocaine, cannabis and opioids.

Such difficulty with protracted sleep problems whilst attempting to maintain abstinence increases the risk of relapse, generally through attempts to self-medicate (Roth, 2009). Brower et al. (2001) found that sleep disturbance was the most significant predictor of relapse to alcohol dependence whilst Foster and Peters (1999) reported that difficulty falling asleep was the most significant predictor of relapse.

The relationship between substance addiction and poor sleep is further complicated by mental health comorbidities (Teplin et al., 2006). Anxiety and depression are associated with sleep difficulties as well as substance use, with complex connections (Cohn et al., 2003). Foster and Peters (1999) reported a significant association between self-reported depression and poor sleep in dependent alcohol drinkers. Mackenzie et al._(1999) found that levels of self-reported
anxiety and depression were significantly reduced in abstinent participants compared to alcohol-dependent ones. They concluded that sleep, anxiety and depression are important markers of relapse in the treatment of those with alcohol dependency. Kolla et al. (2020) reported that sleep disturbance was significantly associated with anxiety and depression measures in their study of those in early recovery from alcohol dependency. Cohn et al. (2003) found that quality of life and depression scores significantly improved over three months of recovery, but sleep quality and anxiety did not. Longitudinal studies often report fluctuations in wellbeing within the initial year of abstinence, generally improving with prolonged years of recovery (Kelly et al., 2018).

Within this broad research field, there appears to be a lack of studies including a comparison group, preventing evaluation between people in recovery and the general population. The current study aimed to explore sleep quality of people in recovery from alcohol and/or substance addiction, alongside a comparison group. The research question and tentative hypothesis being investigated was whether people in recovery have poorer sleep than control participants who have not had a problem with substance addiction. Additionally, measures of mood, wellbeing, and recovery-specific information allowed for further exploration of correlates of poor sleep and the ability to control for these factors given the close, complex associations between them.

## Method

## Design

This study investigated the sleep quality of people in recovery from alcohol and/or substance addiction compared to a comparison sample of people who had never had issues with alcohol and/or substance addiction. It was hypothesised that sleep would be of poorer quality in the recovery group than in the comparison group. Data was collected via an online survey of standardised measures (during the COVID-19 pandemic).

## Participants

Fifty-nine participants in recovery from substance and/or alcohol addiction were recruited through various recovery communities and third-sector organisations across Wales and England (age range 26 to 66). Recovery participants were adults with at least one month of current recovery. This ensured some stability in recovery whilst not being too restrictive for recruitment, based on researchers' knowledge of the population. Additional information was collected about the nature of their addiction and length of time in recovery at the beginning of the survey.

Fifty-seven comparison group participants were recruited, largely through nominations of the recovery participants (age range 25 to 76 ). Comparison participants were adults without current or historical problematic substance and/or alcohol use; a question to confirm this was included at the beginning of the survey. Demographic and Descriptive data

Demographic information was collected including age, gender, ethnicity, marital status, employment status and housing type. Recovery specific information was
collected for recovery group participants including the length of time of the substance dependency, the problematic substances used and current time in recovery.

## Materials

## Sleep Measure

The Pittsburgh Sleep Quality Index (PSQI) was used to measure sleep quality (Buysse et al., 1989). PSQI is a 19-item self-report scale used to calculate seven component scores, added together to give a global sleep quality score between 021, where scores of 6 or more indicate poor sleep. The seven questionnaire component measures are: (1) sleep duration, (2) subjective sleep quality, (3) sleep efficiency, (4) sleep disturbance, (5) sleep medication use, (6) daytime dysfunction, and (7) sleep latency. The PSQI has been validated in numerous languages and shown to have excellent reliability ( $\alpha=.87$ ) (Backhaus et al., 2002; Buysse et al., 2006). In the current study, the Cronbach alpha coefficient was .79.

## Wellbeing Measures

Other measures of wellbeing, including anxiety, depression and quality of life were collected to compare these factors between groups and to be able to control for them given the complex association between mood and sleep.

The Patient Health Questionnaire (PHQ-9) is a valid and reliable measure of depression ( $\alpha=.89$ ). It consists of nine items, each of which is scored 0 to 3 , providing a 0 to 27 severity score for depression. Scores of 5, 10, 15, and 20 represent cut-off points for mild, moderate, moderately-severe and severe depression, respectively (Kroenke et al., 2001). In the current study, the Cronbach alpha coefficient was .91.

The Generalised Anxiety Disorder questionnaire (GAD-7) is a valid and reliable measure of anxiety ( $\alpha=.92$ ). It consists of seven items, each of which is scored 0 to 3 , providing a 0 to 21 severity score for anxiety. Scores of 5, 10, and 15 represent cut-off points for mild, moderate, and severe anxiety, respectively (Spitzer et al., 2006). In the current study, the Cronbach alpha coefficient was . 91 .

The Recovery Strengths Questionnaire (RSQ) consists of 15-items of areas of life, rated on a 0-10 satisfaction scale (higher rating indicates higher satisfaction). The items are, accommodation, finances and physical health which make up a subscale physical strengths; values, mental wellbeing and knowledge/skills which make up the sub-scale personal strengths; positive attitude, ability to bounce back and self-worth which make up the sub-scale attitudinal strengths; recovery, meaningful activity and active learning which make up the sub-scale activity strengths; and social networks, family and partner which make up the sub-scale social strengths (Hogan, 2016; Rettie et al., 2019). The recovery-specific question was excluded from the comparison group survey. In the current study, the Cronbach alpha coefficient was .92 (on the full completion of the scale by recovery group participants).

An additional measure of experiential avoidance was included in the questionnaire battery but ultimately was not used for the analysis.

## Procedure

Ethical approval was obtained from the School of Psychology Ethics Committee at Bangor University (see Appendix A). Following ethical approval, an online survey was created through the University's account with onlinesurveys.ac.uk which included the participant information sheet (Appendix B), provision of informed
consent (Appendix C) and study measures. Participants were informed of their right to withdraw and of how to ask questions, should they need to do so.

Recovery participants were recruited remotely by approaching local thirdsector recovery services known to the third researcher and further networking of UK recovery organisations to invite eligible participants. Promotion through the organisation's social media outlets was undertaken where possible. Recovery participants were directed to the online survey link, or alternatively offered a paper copy in the post with return postage. To try to closely match the recovery group in terms of socio-demographics, recruitment asked these participants to nominate a friend or family member (a person without current or historical problematic drug or alcohol use) to also take part in the study as a comparison group. This was not a mandatory requirement but was requested with an incentive. Within the survey, recovery participants were given the option to enter a prize draw for their participation and an additional prize draw entry for each successful nomination into the comparison group. Prizes consisted of ten shopping vouchers: one $£ 100$, three £50 and six £20 prizes.

The comparison version of the online survey (without recovery-specific questions and separate information sheet, Appendix E) was shared with potential participants either through the recovery participant who nominated them or the researcher via a supplied email address. Comparison participants also had the option to enter the prize draw for their participation.

Towards the end of the data collection window, comparison group recruitment was adapted to increase numbers: through social media invitation, anyone who knew
someone with a previous alcohol/substance problem (e.g., a friend or family member in recovery) were invited to participate in the study.

## Effect Size Calculation

A sample size calculation (parameters: $\beta=0.80, a=0.05$ ) indicated that to detect a medium sized effect size (Cohen's $d=0.5$ ), a sample size of 128 (64 per group) would be required.

Statistical Analysis
The statistical software package IBM SPSS version 27 was used to perform all statistical analyses. In the first instance, descriptive statistics and boxplots were used to look at the distribution of variables. A series of hierarchical multiple regressions were used to understand the individual contribution of the participant group to explain the variance on the global PSQI score, when controlling for age, gender, and anxiety. The components of sleep quality measured within the PSQI were explored between groups for statistical difference using independent $t$-tests.

## Results

Demographic characteristics are summarised in Table 1. Participant groups were similar in age. Gender was largely comparative between groups. Discrepancy can be observed in marital status, housing type and employment status between groups; recovery participants were more likely than comparison participants to be single, in supported or rented property and not working due to long-term illness. The ethnicity of participants was overwhelmingly white (99\%) reflecting the local population, and so is not included in Table 1.

Table 1. Participant Demographic Data

|  | $\begin{aligned} & \text { All } \\ & (n=116) \end{aligned}$ | Recovery Group $(\mathrm{n}=59)$ | Comparison <br> Group ( $\mathrm{n}=57$ ) |
| :---: | :---: | :---: | :---: |
| Age (Mean, (SD)) | 41.32 (10.65) | 42.52 (9.72) | 40.11(11.48) |
| Gender (n, \% male) | 53 (45.70) | 33 (55.90) | 20 (35.1) |
| Marital status (n, (\%))* |  |  |  |
| Single | 34 (29.30) | 26 (44.1) | 8 (14) |
| In a relationship | 37 (31.90) | 15 (25.4) | 22 (38.60) |
| Married | 25 (21.60) | 5 (8.5) | 20 (35.10) |
| Civil partnership | 3 (2.60) | 2 (3.4) | 1 (1.80) |
| Divorced/separated/ widowed | 17 (14.70) | 11 (18.6) | 5 (10.60) |
| Housing type ( $\mathrm{n},(\%))^{* *}$ |  |  |  |
| Own home | 42 (36.20) | 11 (18.6) | 31 (54.40) |
| Private rented | 43 (37.10) | 25 (42.4) | 18 (31.60) |
| Supported living | 14 (12.10) | 14 (23.7) | 0 |
| Council property | 8 (6.90) | 5 (8.5) | 3 (5.30) |
| Living with parents | 8 (6.90) | 3 (5.1) | 5 (8.80) |
| Employment status (n, (\%)) |  |  |  |
| Employed | 75 (64.70) | 24 (40.7) | 51 (89.50) |
| Studying/volunteering | 14 (12.10) | 13 (22) | 1 (1.80) |
| Unemployed | 9 (7.80) | 7 (11.9) | 2 (3.50) |
| Retired | 4 (3.40) | 1 (1.7) | 3 (5.30) |
| Long term illness | 14 (12.10) | 14 (23.7) | 0 |

*One missing comparison group response **One missing recovery group response
Table 2. summarises the frequencies of previous substance use and length of abstinence of the recovery group. A total of $84.5 \%$ of participants had over 5 years of substance dependency, with alcohol being a factor for most of the sample. The majority of the sample (68.4\%) had over 6 months of recovery.

Table 2. Frequencies of, Length of Dependency, Substances Used and Current Period of Recovery.

|  | Recovery Group <br> $(\mathrm{n}=59)$ |
| :--- | :--- |
| Length of time of dependency (n, (\%))* |  |
| $>5$ years | $49(84.50)$ |
| $<5$ years | $9(15.5)$ |
| Substances previously misused (n, (\%)) |  |
| Alcohol only | $27(45.80)$ |
| Polysubstance including opiates | $18(30.50)$ |
| Alcohol \& other drugs (not opiates) | $9(15.20)$ |
| Other drugs (not opiates or alcohol) | $5(8.50)$ |
| Current period of recovery (n, (\%)) ** |  |
| $<6$ months | $18(31.60)$ |
| 6months-2years | $17(29.80)$ |
| $2-5$ years | $14(24.60)$ |
| $5+$ years | $8(14)$ |

*One missing response **Two missing responses

## Initial Analyses

Boxplots showed a variation between participant groups in their PSQI global sleep quality score, with the recovery group showing a higher distribution and mean (see Figure 1). Means for PSQI are above the measure's cut-off score of 6 for poor sleep in both groups, but the higher score in the recovery group indicated poorer sleep quality: $83 \%$ of the recovery group $(\mathrm{n}=49)$ reported poor sleep quality (PSQI>5), compared to $54 \%(n=31)$ of the comparison group.


Figure 1. Boxplot of Global PSQI Score by Participant Group
Table 3. summarises the minimum and maximum scores, means and standard deviations for the measures. Means for GAD-7 and PHQ-9 in both groups are within the 'mild' range of anxiety and depression, however, they are higher in the recovery group compared to the comparison group. Independent $t$-tests indicated these differences were statistically significant for anxiety $t(114)=2.94 p=.004$ and for depression $t(104)=3.32 p=.001$. Higher means are reported for the comparison group on the sub-scales of the RSQ, indicating a higher reported satisfaction in each life area. (Activity strengths is not recorded for the comparison group due to the missing recovery-specific question data). Independent $t$-tests showed these differences were statistically significant: physical strengths $t(113)=-4.40 p<.001$, personal strengths $t(113)=-4.58 p<.001$, attitudinal strengths $t(113)=-2.62 p=.010$, and social strengths $t(113)=-5.24 p<.001$.

Table 3. Descriptive Statistics of Measures

|  | Recovery Group (n=59) |  |  |  | Comparison Group (n=57) |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Measure | Min | Max | Mean (SD) | Min | Max | Mean (SD) |  |
| Global PSQI | 1 | 21 | $8.97(4.18)$ | 1 | 20 | $6.74(4.01)$ |  |
| GAD-7 total | 0 | 21 | $9.34(5.92)$ | 0 | 21 | $6.25(5.36)$ |  |
| PHQ-9 total | 0 | 27 | $9.68(7.25)$ | 0 | 25 | $5.82(5.10)$ |  |
| RSQ |  |  |  |  |  |  |  |
| Physical strengths | 4 | 27 | $17.56(5.58)$ | 5 | 30 | $22.07(5.41)$ |  |
| Personal strengths | 2 | 27 | $18.17(5.82)$ | 6 | 30 | $22.75(5.33)$ |  |
| Attitudinal strengths | 0 | 30 | $18.95(6.81)$ | 3 | 30 | $22.11(6.06)$ |  |
| Activity strengths | 7 | 30 | $21.44(6.11)$ | - | - | - |  |
| Social strengths | 2 | 29 | $18.22(6.24)$ | 9 | 30 | $23.88(5.25)$ |  |

Note. PSQI = Pittsburgh Sleep Quality Index, GAD-7 = anxiety measure, PHQ-9 = depression measure and RSQ = Recovery Strengths Questionnaire.

## Regression Analysis

Hierarchical multiple regression was used to assess the ability of the predictor variable (participant group) to predict sleep quality (PSQI global score), before and after controlling for the influence of age, gender and anxiety. Participant group was entered in Model 1, explaining 5.6\% of the variance in sleep quality. After entry of age and gender in Model 2, the total variance explained by the model was largely unchanged at $5.7 \%$. After the entry of the anxiety measure (GAD-7) in Model 3, the total variance explained by the model was $30.6 \%$. Participant group (i.e., recovery group) was statistically significant in predicting poorer sleep quality in the first model, and in the second model when controlling for age and gender. However, in the third model, age and anxiety were the only significant predictors of sleep quality; with the anxiety measure reporting a higher beta value (see Table 4).

Table 4. Summary of Hierarchical Regression Analysis for Predictors of PSQI


Note. Dependent variable (constant) = PSQI global score

## Further Exploration of Sleep Quality

Independent $t$-tests of the components of the PSQI showed that sleep medication use, sleep disturbance and daytime dysfunction were reported significantly more by the recovery group than by the comparison group (see Table 5).

Table 5. Independent $t$-tests for Components of PSQI

| Sleep Component of PSQI | Recovery <br> Group <br> Mean <br> ( $\mathrm{n}=59$ ) | Comparison Group Mean ( $\mathrm{n}=57$ ) | $t$-test of Difference Between Groups |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Mean <br> Difference | t | df |
| Subjective sleep quality | 1.31 | 1.12 | 0.18 | 1.21 | 114 |
| Sleep efficiency | 1.12 | 0.77 | 0.35 | 1.73 | 114 |
| Sleep latency | 1.61 | 1.33 | 0.28 | 1.45 | 114 |
| Sleep duration | 6.74 | 6.70 | 0.04 | 0.16 | 114 |
| Sleep medication | 0.90 | 0.30 | 0.6* | 2.92 | 103 |
| Sleep disturbance | 1.90 | 1.51 | 0.39* | 3.06 | 114 |
| Daytime dysfunction * $\mathrm{p}=<.05$ (two-tailed) | 1.15 | 0.84 | 0.31* | 2.6 | 114 |

No significant differences in sleep quality were detected within the recovery sample when split according to length of time in recovery. This was likely due to low power in detecting differences.

## Discussion

The purpose of this study was to explore sleep quality of people in recovery from substance addiction compared to a socio-demographically matched comparison group. We additionally aimed to explore measures of wellbeing between groups and control for them in the analysis given the interconnect between sleep, wellbeing and recovery.

Both groups experienced poor sleep quality as evidenced by the mean global PSQI scores. However, 83\% of those in recovery from alcohol and/or substances had poor sleep, compared to $54 \%$ of the comparison group (PSQI>5). This is in line with previously reported prevalence rates of self-reported sleep disturbance in recovery populations (65-88\%; Kolla et_al. 2014,_2020). The prevalence within the comparison group, however, was elevated above the general population average (reported to be around 36\%; Hinzet al., 2017). This may be due to a number of reasons including the sample not being representative of the general population due to the recruitment method, and/or conducting the study within a pandemic which is known to have negatively impacted sleep (NIHR, 2020) and mood (Jia et al., 2020) for many people.

Furthermore, $t$-tests indicated that self-reported anxiety and depression measures were significantly higher in the recovery group compared to the comparison group, although both groups means were in 'mild' range. Independent $t$ tests showed that the comparison group participants also reported significantly better quality of life (as measured by the RSQ). These findings are consistent with the literature that anxiety, depression and quality of life improve with abstinence, but can
problematically persist for some through recovery (Cohn et al., 2003; Kelly et al., 2018; Mackenzie et al., 1999).

The recovery group had significantly poorer sleep than the comparison group. The hierarchical multiple regression revealed that participant group significantly explained $5.7 \%$ of the variance in sleep quality (with adjustment for age and gender). However, with the addition of the anxiety measure into the model, anxiety became the considerably bigger predictor of poor sleep quality (with some influence of age): so anxious people had worse sleep, regardless of group. This is in line with previous literature, Angarita et al. (2016) and Brower et al. (2011) similarly found that sleep disturbance continued to be present for some, despite maintained abstinence. Indeed, anxiety is known to be closely related with sleep disturbance independently of substance addiction (e.g., see review by_Cox \& Olatunii, 2016).

Cohn_et al. (2003) found that measures of sleep quality and anxiety did not improve to the same extent as did quality of life and depression for those in a twelveweek recovery programme. Kolla et al. (2020) reported that anxiety and depression measures were significantly associated with poor sleep within a bivariate model; within a multivariate model, depression was significantly associated with sleep disturbance. The anxiety measure was chosen within the regression model over the depression measure due to the depression scale including a question on sleep. Nonetheless, the connection between sleep and anxiety, and sleep and depression is understood to be interrelated with evidence that all these factors can be affected during recovery.

In particular, the use of sleep medication, sleep disturbance and daytime dysfunction were reported significantly more by the recovery group than by the
comparison group. Previous research has highlighted sleep latency and duration as problematic following abstinence; Foster and_Peters (1999). reported that difficulty with sleep latency was the most significant predictor of relapse. Similarly, Angarita et al. (2016) reviewed the literature and found that short sleep duration and extended latency was consistently reported by those in early and prolonged recovery from alcohol, cocaine, cannabis and opioids. Sleep latency was not significantly different between groups in this study and interestingly, sleep duration was very similar between groups with means below recommended amounts ( $<7$ hours).

The finding relating to use of sleep medication is maybe not surprising given the literature on self-medicating within recovery populations. However, the PSQI simply asks how frequently "medicine to help you sleep" is taken and may be open to interpretation and possibly confounded in the recovery population. Methadone and Buprenorphine are not considered traditional sleep medications but have been found to have some sleep improving qualities (Angarita et al., 2016). Similarly, other medications frequently used by those in recovery (i.e., Acamprosate and Gabapentin) have been shown to improve sleep outcomes (Hartwell et al., 2015).

Higher daytime dysfunction reported by the recovery group indicated increased negative effects of poor sleep, impacting specifically on tiredness in the day and not having enough enthusiasm to get things done. Plausibly, this finding likely relates to mood, particularly depression, and perhaps quality of life, which was also statistically poorer in the recovery group.

No differences in sleep quality were detected within the recovery sample when split according to length of time in recovery (likely due to low power in detecting differences). This would have been interesting to meaningfully explore
given the literature on improvements in sleep quality, mood and quality of life with increased time in recovery (e.g., Brower et al., 2011; Kelly et al., 2018).

## Limitations

Despite some successful remote recruitment during challenging circumstances owing to the COVID-19 pandemic, the sample size was not large enough to meaningfully explore differences within-group. Recruitment methods were designed to gain a socio-demographically matched comparison group. However, it transpired that asking people in recovery to nominate friends or family members without historical or current substance addiction was problematic as they either did not feel comfortable doing so, or more often than not, reported not having such contacts to nominate into the study. Despite best efforts to match groups in this way, it appears that the groups are still quite different demographically; recovery group participants had higher frequency of unemployment, supported or rented housing and single relationship status. All of these factors may have had an impact on the measurements (i.e., sleep, mood and quality of life).

As this study was cross-sectional from a single time-point, the identification of causal relationships was not possible. Furthermore, asking people about their sleep and wellbeing during a time of global uncertainty comes with additional limitations. Fluctuations in the factors measured are very likely for all participants and it is plausible that measures of sleep, mood and quality of life were negatively impacted. This could have contributed to heterogeneity within the samples. Increased prevalence of poor sleep in the comparison group compared to the general population was observed which could be attributable to this also. However, the study relied on self-report data which again, comes with limitations. With regard to self-
reported sleep factors, even more caution must be taken; subjective sleep measure does not always correspond with objective measurement (Girschik et al., 2012). The PSQI measure is a well validated tool recommended for research purposes (Buysse et al., 2006), however, the cut-off score for determining poor sleep has been criticised as being very sensitive (Backhaus et al., 2002), which could also explain higher prevalence.

Despite potential limitations, the current study consisted of a representative, varied sample of people in recovery from alcohol and/or substance addiction. This study had the additional benefit of a comparison group, which is not commonplace within the literature.

## Clinical Implications

Sleep disturbance (and anxiety and depression) appears to be the norm rather than the exception during recovery (Kolla et al., 2020). For this reason, appropriate support should be offered for these difficulties, especially with the evidenced links to relapse (Brower et al., 2001; Mackenzie et al., 1999). Despite the accepted importance of sleep in the recovery journey, there is limited guidance on treatment options (Arnedt et al., 2007). Sleep education is considered a basic foundation for people in recovery, particularly understanding the effects of drugs and alcohol on sleep given the risk of self-medication in this group (Neale et al., 2019). Sleep education is an important component of Cognitive Behaviour Therapy for Insomnia which has some promising results for in those in recovery (see review by Kaplan et al., 2014).

Future research in this area will help clarify the nature of the connection between the recovery journey, sleep and wellbeing. Research should utilise
standardised sleep measures (objective ones where possible), explore the specifics of recovery (length of time in recovery, recovery from alcohol and substances) and include comparison groups. This will inform the nature of the issue and in turn help provide clear, effective intervention options.

## Conclusion

Poor sleep quality is very common in recovery from alcohol and substances: it was $83 \%$ in this study. Being in recovery as opposed to the comparison group significantly predicted poor sleep quality. However, anxiety was shown to be the biggest predictor of poor sleep, regardless of participant group. Measures of anxiety, depression and quality of life were rated significantly poorer in the recovery group than in the comparison group. Future research should aim to further clarify the complex relationship between recovery, sleep and mood to develop effective interventions. Sleep intervention during recovery should be as routine as should support for anxiety and depression given the interconnectedness and links to relapse.

## References

Angarita, G. A., Emadi, N., Hodges, S., \& Morgan, P. T. (2016). Sleep abnormalities associated with alcohol, cannabis, cocaine, and opiate use: A comprehensive review. Addiction Science \& Clinical Practice, 11(1), 9.
https://doi.org/10.1186/s13722-016-0056-7
Arnedt, J. T., Conroy, D. A., \& Brower, K. J. (2007). Treatment options for sleep disturbances during alcohol recovery. Journal of Addictive Diseases, 26(4), 41-54. https://doi.org/10.1300/J069v26n04_06

Backhaus, J., Junghanns, K., Broocks, A., Riemann, D., \& Hohagen, F. (2002). Testretest reliability of the Pittsburgh Sleep Quality Index (PSQI) in patients with primary insomnia. Journal of Psychosomatic Research, 53, 737-740. https://doi.org/10.1016/S0022-3999(02)00330-6

Brower, K. J., Aldrich, M. S., Robinson, E. A. R., Zucker, R. A., \& Greden, J. F. (2001). Insomnia, Self-Medication, and Relapse to Alcoholism. American Journal of Psychiatry, 158(3), 399-404.
https://doi.org/10.1176/appi.ajp.158.3.399
Brower, K. J., Krentzman, A., \& Robinson, E. A. R. (2011). Persistent Insomnia, Abstinence, and Moderate Drinking in Alcohol-Dependent Individuals. The American Journal on Addictions, 20(5), 435-440. https://doi.org/10.1111/j.1521-0391.2011.00152.x

Buysse, D. J., Ancoli-Israel, S., Edinger, J. D., Lichstein, K. L., \& Morin, C. M. (2006). Recommendations for a Standard Research Assessment of Insomnia. Sleep, 29(9), 1155-1173. https://doi.org/10.1093/sleep/29.9.1155

Buysse, D. J., Reynolds C. F, Monk, T. H., Berman S. R, \& Kupfer D. J. (1989). The Pittsburgh Sleep Quality Index (PSQI): A new instrument for psychiatric research and practice. Psychiatry Research, 28, 193-213.

Cohn, T. J., Foster, J. H., \& Peters, T. J. (2003). Sequential studies of sleep disturbance and quality of life in abstaining alcoholics. Addiction Biology, 8(4), 455-462. https://doi.org/10.1080/13556210310001646439

Cox, R. C., \& Olatunji, B. O. (2016). A systematic review of sleep disturbance in anxiety and related disorders. Journal of Anxiety Disorders, 37, 104-129. https://doi.org/10.1016/j.janxdis.2015.12.001

Foster, J. H., \& Peters, T. J. (1999). Impaired Sleep in Alcohol Misusers and Dependent Alcoholics and the Impact Upon Outcome. Alcoholism: Clinical and Experimental Research, 23(6), 1044-1051. https://doi.org/10.1111/j.1530-0277.1999.tb04223.x

Girschik, J., Fritschi, L., Heyworth, J., \& Waters, F. (2012). Validation of SelfReported Sleep Against Actigraphy. Journal of Epidemiology, 22(5), 462-468. https://doi.org/10.2188/jea.JE20120012

Hartwell, E. E., Bujarski, S., Glasner-Edwards, S., \& Ray, L. A. (2015). The Association of Alcohol Severity and Sleep Quality in Problem Drinkers. Alcohol and Alcoholism, 50(5), 536-541. https://doi.org/10.1093/alcalc/agv046

Hinz, A., Glaesmer, H., Brähler, E., Löffler, M., Engel, C., Enzenbach, C., Hegerl, U., \& Sander, C. (2017). Sleep quality in the general population: Psychometric properties of the Pittsburgh Sleep Quality Index, derived from a German community sample of 9284 people. Sleep Medicine, 30, 57-63. https://doi.org/10.1016/j.sleep.2016.03.008

Hogan, L. M. (2016). Recovery strengths questionnaire. Unpublished Questionnaire. Jia, R., Ayling, K., Chalder, T., Massey, A., Broadbent, E., Coupland, C., \& Vedhara, K. (2020). Mental health in the UK during the COVID-19 pandemic: Crosssectional analyses from a community cohort study. BMJ Open, 10(9), e040620. https://doi.org/10.1136/bmjopen-2020-040620

Kaplan, K. A., McQuaid, J., Primich, C., \& Rosenlicht, N. (2014). An Evidence-Based Review of Insomnia Treatment in Early Recovery. Journal of Addiction Medicine, 8(6), 389-394. https://doi.org/10.1097/ADM.0000000000000052

Kelly, J. F., Greene, M. C., \& Bergman, B. G. (2018). Beyond Abstinence: Changes in Indices of Quality of Life with Time in Recovery in a Nationally Representative Sample of U.S. Adults. Alcoholism, Clinical and Experimental Research, 42(4), 770-780. https://doi.org/10.1111/acer. 13604

Kolla, B. P., Mansukhani, M. P., Biernacka, J., Chakravorty, S., \& Karpyak, V. M. (2020). Sleep disturbances in early alcohol recovery: Prevalence and associations with clinical characteristics and severity of alcohol consumption. Drug and Alcohol Dependence, 206, 107655. https://doi.org/10.1016/j.drugalcdep.2019.107655

Kolla, B. P., Schneekloth, T., Biernacka, J., Mansukhani, M., Geske, J., Karpyak, V., Hall-Flavin, D., Louikianova, L., \& Frye, M. A. (2014). The Course of Sleep Disturbances in Early Alcohol Recovery: An Observational Cohort Study. The American Journal on Addictions, 23(1), 21-26. https://doi.org/10.1111/j.15210391.2013.12056.x

Koob, G. F., \& Colrain, I. M. (2020). Alcohol use disorder and sleep disturbances: A feed-forward allostatic framework. Neuropsychopharmacology, 45(1), 141165. https://doi.org/10.1038/s41386-019-0446-0

Kroenke, K., Spitzer, R. L., \& Williams, J. B. W. (2001). The PHQ-9. Journal of General Internal Medicine, 16(9), 606-613. https://doi.org/10.1046/j.15251497.2001.016009606.x

Mackenzie, A., Funderburk, F. R., \& Allen, R. P. (1999). Sleep, Anxiety, and Depression in Abstinent and Drinking Alcoholics. Substance Use \& Misuse, 34(3), 347-361. https://doi.org/10.3109/10826089909035650

Neale, J., Meadows, R., Nettleton, S., Panebianco, D., Strang, J., Vitoratou, S., \& Marsden, J. (2019). Substance use, sleep and intervention design: Insights from qualitative data. Journal of Mental Health, 28(5), 482-489. https://doi.org/10.1080/09638237.2017.1417560

NIHR. (2020). Study explores effects of COVID-19 on sleep. NIHR Oxford Biomedical Research Centre. https://oxfordbrc.nihr.ac.uk/study-explores-effects-of-covid-19-on-sleep/

Rettie, H. C., Hogan, L. M., \& Cox, W. M. (2019). The recovery strengths questionnaire (RSQ) for alcohol and drug use disorders. Drug and Alcohol Review, 38(2), 209-215. https://doi.org/10.1111/dar. 12870

Roth, T. (2009). Does Effective Management of Sleep Disorders Reduce Substance Dependence?: Drugs, 69(Supplement 2), 65-75. https://doi.org/10.2165/11531120-000000000-00000

Spitzer, R., Kroenke, K. I., Williams, J., \& Lowe, B. (2006). Brief Measure for Assessing Generalized Anxiety Disorder: The GAD-7. Copyright: American

Medical Association. Tests \& Measurements, 166(10), 1092-1097.
https://doi.org/10.1001/archinte.166.10.1092
Teplin, D., Raz, B., Daiter, J., Varenbut, M., \& Tyrrell, M. (2006). Screening for Substance Use Patterns among Patients Referred for a Variety of Sleep Complaints. The American Journal of Drug and Alcohol Abuse, 32, 111-120. https://doi.org/10.1080/00952990500328695

## Chapter 3

Contributions to Theory and Clinical Practice

## Introduction

The physical and mental restorative qualities of getting a good night's sleep are well known. This thesis has explored the sleep quality of people who are often stigmatised within society. The current systematic review investigated insomnia and poor sleep quality within the prison population. The empirical study explored sleep quality and wellbeing in people in recovery from substance addiction. This discussion paper aims to consider the findings of both the systematic review and empirical study in terms of their implications for clinical practice and contributions to theory and future research. The paper concludes with a reflective summary of the research process.
"The best bridge between despair and hope is a good night's sleep."
E. Joseph Cossman.

## Theory Development and Implications for Future Research

The current systematic review supported previous research that insomnia and poor sleep quality in prisons, although variable, is prevalent above general population rates (Dewa et al., 2015). Drawbacks of the reviewed research highlighted that despite an increase in study of the prison population's sleep quality through standardised measures, that these measures' parameters are not always consistently implemented. Therefore, in order to develop the theory through future research, this limitation needs to be addressed.

## Self-Report Sleep Measures

There are many standardised measurements designed to identify insomnia symptoms as well as poor sleep (some of which were in included studies within the current systematic review) alongside diagnostic interview, sleep diary and objective sleep measurement (e.g., polysomnography and actigraphy). Self-report data collection is the most practical and cost-effective method for research studies; however self-report measures are not as accurate as objective measurement (Girschik et al., 2012). Both the systematic review and the empirical study included the use of self-report sleep measures.

The Pittsburgh Sleep Quality Index (PSQI) is a renowned measure of poor sleep and is sometimes used to identify insomnia (Backhaus et al., 2002; Buysse et al., 1989). The PSQI was part of both the systematic review and empirical study. Within the systematic review, variation in the cut-off point was seen between studies which had implications for comparing reported prevalence rates. There was the potential by some, to over-estimate poor sleep by classifying a global score of five as poor rather than good sleep. Within the empirical study it was hypothesised that the sensitive cut-off of the measure may have contributed to an inflated prevalence of poor sleep, particularly in the comparison group.

Whilst the measure is useful and established within the literature, perhaps further validation of its parameters is warranted given how society has changed with consequential impacts on sleep since its design in 1989. Geddes (2019) report how modern life, particularly light source, technology, shift work and jet lag have negatively impacted on society's sleep quality. Given this, maybe it's acceptable to move the threshold for quantifying what is 'poor sleep,' and/or expand the descriptive
categories of sleep quality. Some studies have successfully validated the modification of the cut-off in clinical samples. For example, in a study of insomnia in post-acute traumatic brain injury, the cut-off for poor sleep was PSQI>8 with high sensitivity and specificity for clinical insomnia (Fichtenberg et al., 2001).

## Comorbidities of Poor Sleep

The current systematic review and previous review (Dewa et al., 2015) identified that insomnia and poor sleep is often comorbid with psychiatric disorders and substance misuse within prison populations. In the current review paper, anxiety was found to be a correlate of poor sleep in some studies (Dewa et al., 2017b; Li \& Lai, 2019). Similarly in the previous review (Dewa et al., 2015), anxiety was found to be the most commonly comorbid mental health condition to insomnia. Within the empirical study, anxiety was found to be the biggest predictor of poor sleep, regardless of participant group. This complex relationship between particularly anxiety and sleep quality appears to be indiscriminate of clinical group and so warrants further exploration to support causality and appropriate intervention (Cox \& Olatunji, 2016).

The empirical study explored recovery from substance addiction in relation to sleep and wellbeing and the literature surrounding how sleep can be affected during dependence and recovery was discussed. To summarise, sleep processes are known to be directly affected by alcohol and substances (Koob \& Colrain, 2020) and sleep disturbance can persist even after maintained abstinence in some cases (Angarita et al., 2016). Within the current data collection survey, an optional free-text question was included at the end for participants to add anything of further relevance to the survey topics. Eighteen recovery participants gave responses and two specifically mentioned how they had experienced more sleep disturbance during
early recovery that had somewhat improved with prolonged abstinence. This represents an important research area to further clarify in terms of how and when intervention may be best placed within the recovery journey. It also has important implications for substance use relapse prevention.

Furthermore, substance misuse is known to be a problem within prisons contributing to violence, crime and vulnerability (HM Prison and Probation Service, 2019). History of substance addiction was identified within the current and previous review as a correlate of insomnia (Dewa et al., 2015). It is very likely that craving or withdrawal effects of substances in prison settings has an impact on the sleep quality of inmates (Getachew et al., 2020). Harner and Budescu (2014) highlighted the loss of access to substances to self-medicate sleep while in prison, which is thought to contribute to higher levels of poor sleep in prison populations.

## Insomnia Treatment

## Pharmaceutical Treatment

The high prevalence of sleep disruption in the prison population is most frequently managed with prescription medication. Elger et al._(2002) reported that in Geneva, the use of hypnotic and anxiolytic medication was ten times higher in prisons when compared to a sample of community outpatients. In France, Goudard et al. (2017) reported that $25 \%$ of their sample of prison inmates were taking prescribed hypnotic medication. In the UK, Dewa et al. (2017a) found in their survey that $88 \%$ of responding prisons offered medication to treat insomnia. The most prescribed medication was Zopiclone (95\%) followed by antihistamines (47\%) and Mirtazapine (26\%). Similarly in a review including ten studies, hypnotic medication (i.e., Zolpidem and Benzodiazepines) was found to be the most common treatment for insomnia in
prisons, with some evidence of long-term use (Dewa et al., 2015). This form of treatment comes with potential difficulties when we consider the prison population commonly having significant and concurrent mental health treatment needs, often compounded by personality disorder and substance misuse. When combined with the recommended short-term nature of sleep medication, this often leads to off-label prescribing (Brink, 2018). Dewa et al. noted that there was difficulty in distinguishing genuine insomnia and medication-seeking to misuse, sell or trade. Brink (2018) reported that prescribing trazodone for sleep difficulties may avoid risking relapse into benzodiazepine dependence.

Similarly in recovery from substance/alcohol use, pharmaceutical treatment is frequent but perhaps more reluctant. This is consistent with the view that medications should be avoided in recovery due to potential for abuse, addiction and reinforcement of using substances to regulate discomfort (Kaplan et al., 2014). Friedmann et al..(2003) reported in their USA-based survey that although 64\% of doctors reported recommending medication to improve recovery patient's sleep, on average, medication was only prescribed to $30 \%$ of these patients. Trazodone was the preferred medication (38\%) followed by other sedating antidepressants (12\%), and antihistamines (12\%). The mean duration of treatment using trazodone and antidepressants was over the one-month recommendation. Conversely, doctor's reluctance to treat sleep disturbance with medication may be counterproductive because poor sleep is known to contribute towards risk of relapse. However, medications prescribed during recovery such as Methadone, Buprenorphine, Acamprosate and Gabapentin have been found to have some sleep improving qualities (Angarita et al., 2016; Hartwell et al., 2015). Either way, the importance of a
prudent approach to sleep disturbance during recovery considering individual factors cannot be disputed.

Within the current empirical study, the reported use of sleep medication was reported significantly more by the recovery group than the comparison group. Furthermore, within the optional free-text response, six of the eighteen recovery participant responses mentioned medication to aid sleep as opposed to two of the eight comparison participant responses. Two recovery participants specifically mentioned Mirtazapine and two mentioned opiate replacement medications (the remaining two mentioned medication more generally). The two comparison participants mentioned anti-depressant medications.

## Psychological Intervention

Spielman's 3-P model of insomnia is beneficial for understanding the development of insomnia in the populations discussed within this thesis. The model describes insomnia emerging with a combination of a predisposing factor (e.g., mental health difficulty) along with a precipitating event (e.g., a stressful life event). Chronic insomnia usually then develops due to a perpetuating factor which can be behavioural or cognitive e.g., negative thinking, napping or taking substances to aid sleep or wake (Spielman et al. 2 1987).

Cognitive Behaviour Therapy for Insomnia (CBT-I) is a structured, short-term, skill-focused psychotherapy aimed at changing maladaptive cognitions and behaviours contributing to insomnia. CBT-I usually consists of psychoeducation/sleep hygiene, relaxation training, stimulus control therapy, sleep restriction therapy and cognitive therapy. It is a first-line treatment for chronic insomnia in adults of any age (Riemann et al., 2017). CBT-I has evidence for use in
the prison population (e.g., Randall et al.,_2019) and recovery population (e.g., Kaplan et al.,.2014).

Dewa et al. (2017a) found in their survey that most prisons offered nonpharmaceutical interventions for sleep problems, predominantly sleep hygiene (94\%). Only 39\% offered CBT which was mainly for conditions such as anxiety and not for insomnia alone. Only one prison (out of 84) reported offering CBT-I. Randall et al. (2019) found that a one-off 60-70 minute CBT-I intervention session and selfhelp handout was significantly effective at reducing insomnia in male prisoners. Furthermore, there were significant reductions in depression and anxiety symptoms. The study lacked a control group but does provide promising evidence for a time and cost-effective intervention.

CBT-I also has promising evidence for people in recovery from alcohol and substances. Currie et al. (2004) provided five sessions of CBT-I with a self-help manual and five telephone support calls. They found that treatment participants improved significantly more than control participants on sleep quality, efficiency, awakenings and sleep latency, with maintenance over six months. Arnedt, Conroy, Rutt, et al. (2007) also found that eight sessions of CBT-I improved mood and quality of life measures in addition to sleep quality. Arnedt, Conroy, and Brower (2007) reported that despite the accepted importance of sleep in the recovery journey, there is limited guidance on treatment options. They propose possible barriers to this including, sleep often being secondary to the primary substance addiction and seen as less important, or doctors being wary of prescribing sleep medication due to risk of addiction with limited awareness of other treatment options. Given the implications to relapse as well as concurrent improvements in anxiety and depression,
psychological intervention options such as CBT-I should be researched further for efficacy and be clearly outlined as evidence-based options, made available in recovery services.

## Implications for Clinical Practice

## Systematic Review

The systematic review findings emphasise the problem of poor sleep quality within the prison population which warrants adequate investment into identification and intervention. Treatment practices should review current reliance on pharmaceuticals and include psychological interventions such as CBT-I and practical solutions to create sleep-conducive prison environments, where possible. Without this, inadequate sleep is associated with potential risks to cognitive impairment, increased aggression, reduced impulse control, emotional dysregulation, increased risk of suicide (Barker et al., 2016; Bos \& Macedo, 2019; Carli et al., 2011).

## Empirical Study

The empirical study also raises the importance of sleep within the recovery journey from alcohol and substances, highlighting the significance of providing support during this vulnerable time. Given the interconnectedness between sleep and anxiety demonstrated in the study, intervention to help improve sleep should be as commonplace as anxiety management is during recovery.

During the current COVID-19 pandemic, research has shown that the general population's sleep has been negatively impacted (NIHR, 2020). People in recovery from addiction are a vulnerable group in terms of sleep, mood, wellbeing and risk of relapse (Cohn et al., 2003). After more than a year of uncertainty and restricted
social contact there are recognised adversities for this group in particular. For example, alcohol-related deaths are at a 20-year high in Wales, rising by 19\% in 2020 from 2019 (BBC, 2021). Although recovery services continue to operate, they have been hugely impacted in their delivery, which has been more reliant on technology than before. This poses a barrier to some, in a group which is known to have high levels of social deprivation. Furthermore, those in the most deprived areas had the highest rate of alcohol-related deaths (BBC, 2021). It is more important than ever to ensure that adequate emotional support is provided to those in need and at risk of isolation.

## Reflective Commentary

Completing this research project has not been as I envisaged. I had expected to be able to encounter people face to face in order to collect data. And even though this project was designed with the pandemic in mind, I had never fully appreciated what it would be like to complete it entirely remotely. In some ways I have been grateful for the reduced distractions the pandemic has brought; but haven't we all been plagued by more distraction in a way, through worry and uncertainty? Not only did the pandemic change the way data was collected, but it also impacted on the support and interaction from friends, family and colleagues I would have otherwise received. Nevertheless, I am very appreciative of the support I have received and to all participants who took part in the project.

As someone research does not come easy to, coming up with a project took some time. Sleep has remained an interest of mine, ever since I took on A Level Psychology and I completed research projects of this topic for my undergraduate and
master's degree. I have not had a job in mental health or placement on this training programme where sleep wasn't an issue for the people I was working with, so I had a very broad net of ideas. Surprisingly, I have always found that sleep intervention is not always given the priority that the research highlights that it warrants. The outbreak of COVID-19 resulted in a last-minute alteration to my planned placement, and I found myself in the Substance Misuse Service (SMS). Although I did not get the full experience of this placement due to pandemic-related restrictions, I really enjoyed this area of work. I found that I was in 'the right place at the right time' and the project idea came to fruition with the support and encouragement of my supervisor Dr Lee Hogan. Throughout my career so far, empowering and standing up for marginalised groups and challenging stereotypes is something which is important to me. Working within the SMS sparked that in me and so I was happy I was conducting research in this field.

Remote data collection can be a tense time as there is little way of knowing how many people will take up the study offer, without the meaningful addition of a friendly face and interaction alongside the study invitation. And although there is no doubt that we would have recruited more if I was able to visit recovery communities and organisations, I am very pleased with the sample we were able to recruit in this way. I am grateful to each organisation who shared the study initiation on our behalf.

The way which the comparison group was recruited was an important element of the study design to try and recruit a matched sample. I had imagined that there could be stumbling blocks with this method due to the often limited social support of people in recovery. Indeed, in the empirical paper results, the 'social strengths' subcategory of the Recovery Strengths Questionnaire indicated significantly lower
reported social support in the recovery group than comparison group. Nevertheless, I was pleased that the sample was successfully recruited in this way, and it provides a possible method to recruit comparison groups for future research in this area.

Most recently I have been able to complete the prize draw for participants in the study. This has been a nice way to give back to the people who took time to participate in the study and provide some positivity during a time where this has felt scarce.

## References

Angarita, G. A., Emadi, N., Hodges, S., \& Morgan, P. T. (2016). Sleep abnormalities associated with alcohol, cannabis, cocaine, and opiate use: A comprehensive review. Addiction Science \& Clinical Practice, 11(1), 9. https://doi.org/10.1186/s13722-016-0056-7

Arnedt, J. T., Conroy, D. A., \& Brower, K. J. (2007). Treatment options for sleep disturbances during alcohol recovery. Journal of Addictive Diseases, 26(4), 41-54. https://doi.org/10.1300/J069v26n04_06

Arnedt, J. T., Conroy, D., Rutt, J., Aloia, M. S., Brower, K. J., \& Armitage, R. (2007). An open trial of cognitive-behavioral treatment for insomnia comorbid with alcohol dependence. Sleep Medicine, 8(2), 176-180. https://doi.org/10.1016/j.sleep.2006.06.007

Backhaus, J., Junghanns, K., Broocks, A., Riemann, D., \& Hohagen, F. (2002). Testretest reliability of the Pittsburgh Sleep Quality Index (PSQI) in patients with primary insomnia. Journal of Psychosomatic Research, 53, 737-740. https://doi.org/10.1016/S0022-3999(02)00330-6

Barker, L. F., Ireland, J. L., Chu, S., \& Ireland, C. A. (2016). Sleep and its association with aggression among prisoners: Quantity or quality? International Journal of Law and Psychiatry, 47, 115-121. APA PsycInfo®. https://doi.org/10.1016/j.ijlp.2016.02.014

BBC. (2021, May 6). Wales' alcohol deaths highest for 20 years. BBC News. https://www.bbc.com/news/uk-wales-57007787

Bos, S., \& Macedo, A. (2019). Literature review on Insomnia (2010-2016). Biological Rhythm Research, 50, 1-70. https://doi.org/10.1080/09291016.2017.1413766

Brink, J. (2018). Challenges in Correctional Psychiatry: Off-Label Prescribing. Canadian Journal of Psychiatry. Revue Canadienne de Psychiatrie, 63(10), 645-647. https://doi.org/10.1177/0706743718782930

Buysse, D. J., Reynolds C. F, Monk, T. H., Berman S. R, \& Kupfer D. J. (1989). The Pittsburgh Sleep Quality Index (PSQI): A new instrument for psychiatric research and practice. Psychiatry Research, 28, 193-213.

Carli, V., Roy, A., Bevilacqua, L., Maggi, S., Cesaro, C., \& Sarchiapone, M. (2011). Insomnia and suicidal behaviour in prisoners. Psychiatry Research, 185(1-2), 141-144. APA PsycInfo®. https://doi.org/10.1016/j.psychres.2009.10.001

Cohn, T. J., Foster, J. H., \& Peters, T. J. (2003). Sequential studies of sleep disturbance and quality of life in abstaining alcoholics. Addiction Biology, 8(4), 455-462. https://doi.org/10.1080/13556210310001646439

Cox, R. C., \& Olatunji, B. O. (2016). A systematic review of sleep disturbance in anxiety and related disorders. Journal of Anxiety Disorders, 37, 104-129. https://doi.org/10.1016/j.janxdis.2015.12.001

Currie, S. R., Clark, S., Hodgins, D. C., \& El-Guebaly, N. (2004). Randomized controlled trial of brief cognitive-behavioural interventions for insomnia in recovering alcoholics. Addiction, 99(9), 1121-1132.
https://doi.org/10.1111/j.1360-0443.2004.00835.x
Dewa, L. H., Hassan, L., Shaw, J. J., \& Senior, J. (2017a). Insomnia management in prisons in England and Wales: A mixed-methods study. Journal of Sleep Research, 26(3), 322-329. https://doi.org/10.1111/jsr. 12503

Dewa, L. H., Hassan, L., Shaw, J. J., \& Senior, J. (2017b). Trouble sleeping inside: A cross-sectional study of the prevalence and associated risk factors of insomnia in adult prison populations in England. Sleep Medicine, 32, 129136. APA PsycInfo®. https://doi.org/10.1016/j.sleep.2016.12.018

Dewa, L. H., Kyle, S. D., Hassan, L., Shaw, J., \& Senior, J. (2015). Prevalence, associated factors and management of insomnia in prison populations: An integrative review. Sleep Medicine Reviews, 24, 13-27.
https://doi.org/10.1016/j.smrv.2014.12.002
Elger, B. S., Goehring, C., Revaz, S. A., \& Morabia, A. (2002). Prescription of hypnotics and tranquilisers at the Geneva prison's outpatient service in comparison to an urban outpatient medical service. Sozial- Und Praventivmedizin, 47(1), 39-43. https://doi.org/10.1007/BF01318404

Fichtenberg, N. L., Putnam, S. H., Mann, N. R., Zafonte, R. D., \& Millard, A. E. (2001). Insomnia Screening in Postacute Traumatic Brain Injury: Utility and Validity of the Pittsburgh Sleep Quality Index. American Journal of Physical Medicine \& Rehabilitation, 80(5), 339-345.

Friedmann, P. D., Herman, D. S., Freedman, S., Lemon, S. C., Ramsey, S., \& Stein, M. D. (2003). Treatment of sleep disturbance in alcohol recovery: A national survey of addiction medicine physicians. Journal of Addictive Diseases, 22(2), 91-103. https://doi.org/10.1300/J069v22n02_08

Geddes, L. (2019, February 8). How modern life gets in the way of sleep. The Guardian. http://www.theguardian.com/lifeandstyle/2019/feb/08/how-modern-life-gets-in-the-way-of-sleep-chronic-insomnia

Getachew, Y., Azale, T., \& Necho, M. (2020). Poor sleep quality and associated factors among prisoners of the Diredawa correctional facility in eastern Ethiopia. Annals of General Psychiatry, 19(1), 1-9. rzh. https://doi.org/10.1186/s12991-020-00291-6

Girschik, J., Fritschi, L., Heyworth, J., \& Waters, F. (2012). Validation of SelfReported Sleep Against Actigraphy. Journal of Epidemiology, 22(5), 462-468. https://doi.org/10.2188/jea.JE20120012

Goudard, A., Lalande, L., Bertin, C., Sautereau, M., Le Borgne, M., \& Cabelguenne, D. (2017). Sleep disorders and therapeutic management: A survey in a French population of prisoners. Journal of Correctional Health Care, 23(2), 193-202. APA PsycInfo®. https://doi.org/10.1177/1078345817700163

Harner, H. M., \& Budescu, M. (2014). Sleep quality and risk for sleep apnea in incarcerated women. Nursing Research, 63(3), 158-169. APA PsycInfo®. https://doi.org/10.1097/NNR. 0000000000000031

Hartwell, E. E., Bujarski, S., Glasner-Edwards, S., \& Ray, L. A. (2015). The Association of Alcohol Severity and Sleep Quality in Problem Drinkers. Alcohol and Alcoholism, 50(5), 536-541. https://doi.org/10.1093/alcalc/agv046

HM Prison and Probation Service. (2019). Prison Drugs Strategy. 27.
Kaplan, K. A., McQuaid, J., Primich, C., \& Rosenlicht, N. (2014). An Evidence-Based Review of Insomnia Treatment in Early Recovery. Journal of Addiction Medicine, 8(6), 389-394. https://doi.org/10.1097/ADM.0000000000000052

Koob, G. F., \& Colrain, I. M. (2020). Alcohol use disorder and sleep disturbances: A feed-forward allostatic framework. Neuropsychopharmacology, 45(1), 141165. https://doi.org/10.1038/s41386-019-0446-0

Li, M., \& Lai, H. (2019). Insomnia and its associated factors in incarcerated adults: A cross-sectional study. Nursing \& Health Sciences, 21(3), 330-335. APA PsycInfo®. https://doi.org/10.1111/nhs. 12600

NIHR. (2020). Study explores effects of COVID-19 on sleep. NIHR Oxford Biomedical Research Centre. https://oxfordbrc.nihr.ac.uk/study-explores-effects-of-covid-19-on-sleep/

Randall, C., Nowakowski, S., \& Ellis, J. G. (2019). Managing Acute Insomnia in Prison: Evaluation of a 'One-Shot’ Cognitive Behavioral Therapy for Insomnia (CBT-I) Intervention. Behavioral Sleep Medicine, 17(6), 827-836. cmedm. https://doi.org/10.1080/15402002.2018.1518227

Riemann, D., Baglioni, C., Bassetti, C., Bjorvatn, B., Groselj, L. D., Ellis, J. G., Espie, C. A., Garcia-Borreguero, D., Gjerstad, M., Gonçalves, M., Hertenstein, E., Jansson-Fröjmark, M., Jennum, P. J., Leger, D., Nissen, C., Parrino, L., Paunio, T., Pevernagie, D., Verbraecken, J., ... Spiegelhalder, K. (2017). European guideline for the diagnosis and treatment of insomnia. Journal of Sleep Research, 26(6), 675-700. https://doi.org/10.1111/jsr. 12594

Spielman, A., Saskin, P., \& Thorpy, M. (1987). Treatment of Chronic Insomnia by Restriction of Time in Bed. Sleep, 10, 45-56.
https://doi.org/10.1093/sleep/10.1.45

## Appendices

A. Bangor University School of Psychology Ethical Approval
B. Recovery Participant Information Sheet
C. Onlinesurvey.ac.uk Consent Form
D. Paper Version Consent Form
E. Comparison Participant Information Sheet
F. Pittsburgh Sleep Quality Index (PSQI)
G. Patient Health Questionnaire (PHQ-9)
H. Generalised Anxiety Disorder (GAD-7)
I. Recovery Strengths Questionnaire (RSQ)
J. Word Count Statement

## A. Bangor University School of Psychology Ethical Approval

Ethical approval granted for 2020-16829 Exploring the sleep quality ofpeople in recovery from substance misuse.
ethics@bangor.ac.uk [ethics@bangor.ac.uk](mailto:ethics@bangor.ac.uk)
Thursday, 19 November 2020 at 15:10
To: Nia Sheppard

## Dear Nia,

2020-16829 Exploring the sleep quality of people in recovery from substance misuse
Your research proposal number 2020-16829
has been reviewed by the School of Psychology Ethics and Research Committee
and the committee are now able to confirm ethical and governance approval for the above research on the basis described in the application form, protocol and supporting documentation. This approval lasts for a maximum of three years from this date.

Ethical approval is granted for the study as it was explicitly described in the application
If you wish to make any non-trivial modifications to the research project, please submit an amendment form to the committee, and copies of any of the original documents reviewed which have bee altered as a result of the amendment. Please also inform the committee immediately if participants experience any unanticipated harm as a result of taking part in your research, or if any adverse reactions are reported in subsequent literature using the same technique elsewhere.

## B. Recovery Participant Information Sheet

## Recovery Participant Information Sheet

Title of Study: Exploring the sleep quality of people in recovery from substance misuse.
Investigator: Nia Sheppard (nbs18gbs@bangor.ac.uk)
Supervisor: Dr Lee Hogan (lee.hogan@bangor.ac.uk)
Ethics Approval Number: 2020-16829

## Background

Sleep is vital for all of us to ensure we have good physical and mental health. The relationship between sleep and health is closely connected to our mood, feelings of anxiety and our general wellbeing.

We wish to explore the impact of sleep quality for people who are in recovery from illicit substance use or alcohol use. We are interested in the relationship between mental health, wellbeing, and quality sleep for people in their recovery journey.

## Aims of the research

This study aims to investigate the connection between sleep and wellbeing for people in recovery from illicit substance use and/or alcohol use and also for people who have never had illicit substance abuse or alcohol abuse problems. This study seeks to answer the following questions:

1. Is sleep more impaired in people who are in recovery from substance misuse (including alcohol) than it is for people who have never abused substances?
2. Are sleep profiles different for people who are in early recovery compared to those in late recovery?
3. Is poorer mental wellbeing positively correlated with poor sleep quality?

## Why have I been asked to take part and what does it involve?

We are inviting people who are in recovery from previous significant drug or alcohol use to take part in this research. To take part, you must have previously had a drug or alcohol addiction and are now abstinent from substances for at least one month.

You will be required to answer a series of questionnaires about yourself, your recovery journey, your sleep, your mood and your wellbeing. We anticipate that these questionnaires should take approximately 20 minutes to complete.

Your participation is entirely voluntary and whether you choose to participate or not will have no impact on any treatments you receive or any other programmes you participate in. If you choose to participate, then you are able to withdraw at any time without explanation.

We also kindly request that you allocate a willing friend or family member who has not had previous or current substance or alcohol addiction to also take part in the study. They will act
as 'comparison' group to the other people who are in recovery. This can be completed via email address contact or telephone number. You are still able to take part if you are not able to nominate another person to take part.

## Rewards

For your time participating in the study, you will be entered into a prize draw with ten monetary gift voucher prizes: one participant will win $£ 100$, three participants will win $£ 50$, and six participants will win $£ 20$. Prize winners will be drawn and contacted in May 2021. Entry into the prize draw requires completion of the study questionnaires and so withdrawal from the study will result in exclusion from the prize draw.

In addition to this, for each successful participant you allocate into the study comparison group, you will gain an extra entry into the prize draw, increasing your chances of winning.

## Risks/Discomforts

We do not expect your participation in this study to place you at risk in any way or cause you any discomfort. In spite of this, please remember that your participation in this study is voluntary, so you can withdraw from the study at any point without having to provide an explanation, and you can omit any question that you do not want to answer.

## Confidentiality

All of the data we collect will be confidential, and you will not be identified in any report, thesis or publication that arises from this study. Furthermore, any data/information you provide us with, will only be seen by the investigators of this study and it will only be used for the purposes of this study. It will be kept in locked storage and it will be destroyed following data analysis.

Confidentiality will not be maintained if you disclose a risk of significant harm to you or someone else, or there is disclosure of a serious crime. These instances will be managed on a case-by-case basis, and this would be discussed with you before disclosure to the relevant services.

## Who do I contact about the study?

If you have any questions about the study, please email the principle investigator Nia Sheppard (trainee clinical psychologist) via email - nbs18gbs@,bangor.ac.uk

## Who do I contact with any complaints about this study?

If you have any concerns or complaints about this study, then please contact Huw Ellis, School Administrator, School of Psychology, Brigantia Building, Bangor University, LL57 2AS or email huw.ellis@bangor.ac.uk

## C. Onlinesurvey.ac.uk Consent Form

(1.) I have read the information about the study and had the opportunity to consider the information and ask questions. * Required

```
Yes
```

a. I understand that my participation is voluntary, and that I may withdraw at any time without explanation. * RequiredYes
b. I understand that my rights to anonymity and confidentiality will be respected (with the conditions described in the information sheet where a disclosure of information will occur). Required

```
Yes
```

c. I agree to take part in the study. * RequiredYes

## D. Paper Version Consent Form

## Informed Consent Form

Title of Study: Exploring the sleep quality of people in recovery from substance misuse.
Investigator: Nia Sheppard (nbs18gbs@bangor.ac.uk)
Supervisor: Dr Lee Hogan (lee.hogan@bangor.ac.uk)
Please write your initials if you agree with the sentence

| I have read the information sheet and had the opportunity to consider the <br> information and ask questions. |  |
| :--- | :--- |
| I understand that my participation is voluntary, and that I may withdraw at any <br> time without explanation. |  |
| I understand that my rights to anonymity and confidentiality will be respected <br> (with the conditions described in the information sheet where a disclosure of <br> information will occur). |  |
| I agree to take part in the above study. |  |

Date:
Signature of Participant:

Date: $\qquad$
Investigator's Name $\qquad$
Signature of Investigator

## E. Comparison Participant Information Sheet

## Comparison Participant Information Sheet

Title of Study: Exploring the sleep quality of people in recovery from substance misuse.
Investigator: Nia Sheppard (nbs18gbs@bangor.ac.uk)
Supervisor: Dr Lee Hogan (lee.hogan@bangor.ac.uk)
Ethics Approval Number: 2020-16829

## Background

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This study aims to investigate the connection between sleep and wellbeing for people in recovery from illicit substance use and/or alcohol use and also for people who have never had illicit substance abuse or alcohol abuse problems. This study seeks to answer the following questions:

1. Is sleep more impaired in people who are in recovery from substance misuse (including alcohol) than it is for people who have never abused substances?
2. Are sleep profiles different for people who are in early recovery compared to those in late recovery?
3. Is poorer mental wellbeing positively correlated with poor sleep quality?

## Why have I been asked to take part and what does it involve?

Alongside people who are in recovery from significant drug or alcohol addiction, we are recruiting a comparison group. You have been put forward by someone who has participated in our recovery group sample to participate in the comparison group. To take part, you must not have a current or previous problem with heavy drug or alcohol use.

You will be required to answer a series of questionnaires about yourself, your sleep, your mood and your wellbeing. We anticipate that these questionnaires should take approximately 20 minutes to complete.

Your participation is entirely voluntary. If you choose to participate, then you are able to withdraw at any time without explanation.

## Rewards

For your time participating in the study, you will gain entry into a prize draw with ten monetary gift voucher prizes: one participant will win $£ 100$, three participants will win $£ 50$, and six participants will win $£ 20$. Prize winners will be drawn and contacted in May 2021. Entry into the prize draw requires completion of the study questionnaires and so withdrawal from the study will result in exclusion from the prize draw.

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## Confidentiality

All of the data we collect will be confidential, and you will not be identified in any report, thesis or publication that arises from this study. Furthermore, any data/information you provide us with, will only be seen by the investigators of this study and it will only be used for the purposes of this study. It will be kept in locked storage and it will be destroyed following data analysis.
Confidentiality will not be maintained if you disclose a risk of significant harm to you or someone else, or there is disclosure of a serious crime. These instances will be managed on a case-by-case basis, and this would be discussed with you before disclosure to the relevant services.

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## Who do I contact with any complaints about this study?

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## F. Pittsburgh Sleep Quality Index (PSQI)

Instructions: The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. Please answer all questions.

1. During the past month, what time have you usually gone to bed at night? $\qquad$
2. During the past month, how long (in minutes) has it usually taken you to fall asleep each night? $\qquad$
3. During the past month, what time have you usually gotten up in the morning? $\qquad$
4. During the past month, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spent in bed.) $\qquad$

| 5. During the past month, how often have you had <br> trouble sleeping because you... | Not during <br> the past <br> month | Less than <br> once a <br> week | Once or <br> twice a <br> week | Three or more <br> times a week |
| :--- | :--- | :--- | :--- | :--- |
| a. Cannot get to sleep within 30 minutes |  |  |  |  |
| b. Wake up in the middle of the night or early <br> morning |  |  |  |  |
| c. Have to get up to use the bathroom |  |  |  |  |
| d. Cannot breathe comfortably |  |  |  |  |
| e. Cough or snore loudly |  |  |  |  |
| f. Feel too cold |  |  |  |  |
| g. Feel too hot |  |  |  |  |
| h. Have bad dreams |  |  |  |  |
| i. Have pain |  |  |  |  |
| j. Other reason(s), please describe: |  |  |  |  |
| 6. During the past month, how often have you <br> taken medicine to help you sleep (prescribed or <br> "over the counter")? |  |  |  |  |
| 7. During the past month, how often have you had <br> trouble staying awake while driving, eating meals, <br> or engaging in social activity? | No <br> problem <br> at all | Only a <br> very slight <br> problem | Somewhat <br> of a <br> problem | A very big <br> problem |
|  |  |  |  |  |
| 8. During the past month, how much of a problem <br> has it been for you to keep up enough enthusiasm <br> to get things done? | Very <br> good | Fairly <br> good | Fairly <br> bad | Very <br> bad |
|  |  |  |  |  |
| 9. During the past month, how would you rate <br> your sleep quality overall? |  |  |  |  |

## G. Patient Health Questionnaire (PHQ-9)

| Over the last 2 weeks, how often have you been bothered by any of the following problems? | Not at all | Several days | More than half the days | Nearly every day |
| :---: | :---: | :---: | :---: | :---: |
| 1 Little interest or pleasure in doing things | 0 | 1 | 2 | 3 |
| 2 Feeling down, depressed, or hopeless | 0 | 1 | 2 | 3 |
| 3 Trouble falling or staying asleep, or sleeping too much | 0 | 1 | 2 | 3 |
| 4 Feeling tired or having little energy | 0 | 1 | 2 | 3 |
| 5 Poor appetite or overeating | 0 | 1 | 2 | 3 |
| 6 <br> Feeling bad about yourself - or that you are a failure or have let yourself or your family down | 0 | 1 | 2 | 3 |
| 7 Trouble concentrating on things, such as reading the newspaper or watching television | 0 | 1 | 2 | 3 |
| Moving or speaking so slowly that other people could have noticed? Or 8 the opposite - being so fidgety or restless that you have been moving around a lot more than usual | 0 | 1 | 2 | 3 |
| 9 Thoughts that you would be better off dead or of hurting yourself in some way | 0 | 1 | 2 | 3 |

H. Generalised Anxiety Disorder (GAD-7)

| Over the last 2 weeks, how often have you been bothered by any of the following problems? | Not at all | Several days | More than half the days | Nearly every day |
| :---: | :---: | :---: | :---: | :---: |
| Feeling nervous, anxious or on edge | 0 | 1 | 2 | 3 |
| Not being able to stop or control worrying | 0 | 1 | 2 | 3 |
| Worrying too much about different things | 0 | 1 | 2 | 3 |
| Trouble relaxing | 0 | 1 | 2 | 3 |
| Being so restless that it is hard to sit still | 0 | 1 | 2 | 3 |
| Becoming easily annoyed or irritable | 0 | 1 | 2 | 3 |
| Feeling afraid as if something awful might happen | 0 | 1 | 2 | 3 |

## I. Recovery Strengths Questionnaire (RSQ)

## Recovery Strengths Questionnaire

The recovery strengths questionnaire assesses your satisfaction across many areas of your life. These areas represent your own personal "Recovery Strengths"-that is, the existing resources that you have to support your recovery.

## Instructions

Please circle the number to indicate how satisfied you feel in relation to each of the questions below. Each question is rated on a 0 - to 10 -point scale, with $10=$ a high-level of satisfaction and $0=$ a sense of dissatisfaction.

1. How satisfied are you with your home/accommodation? A score of 10 indicates a high level of satisfaction (e.g., you might have a long-term place to live that is secure and safe). A score of 0 indicates a sense of dissatisfaction or insecurity in where you live.

| Accommodation | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
|  | Not at all <br> satisfied |  |  |  |  |  |  |  | Completely <br> satisfied |  |
|  |  |  |  |  |  |  |  |  |  |  |

2. How satisfied are you with your finances / money? A score of 10 indicates a high level of security (e.g., a reliable source of income, few demands or little debt). A score of 0 indicates a poor level of security (e.g., high debt and infrequent/unreliable access to money).

| Finances/money | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | 10 | Completely |
| ---: | :--- |
| satisfied |

3. How satisfied are you with your level of physical health? A score of 10 indicates a high level of satisfaction (e.g., you are physically active, without pain or discomfort). A score of 0 indicates a sense of dissatisfaction (e.g., you find it difficult to maintain good health or activity).

| Physical Health | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | 10

## Instructions

Please circle the number to indicate how satisfied you feel, right now, in relation to each of the questions below. Each question is rated on a 0 - to 10 -point scale, with $10=$ a high-level of satisfaction and $0=$ a sense of dissatisfaction.
4. How satisfied are you with your ability to live according to your own values and/or your spirituality? A score of 10 indicates a high level of satisfaction (e.g., you live a valued life and/or you feel spirituality connected). A score of 0 indicates a sense of dissatisfaction or inability to live to your own values or you feel a spiritual disconnection.

| Values / Spirituality | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
|  | Not at all <br> satisfied |  |  |  |  |  |  |  | Completely <br> satisfied |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |

5. How satisfied are you with your level of mental wellbeing? A score of 10 indicates a high level of satisfaction (e.g., you can comfortably manage day-to-day life). A score of 0 indicates dissatisfaction (e.g., you are frequently distressed and your day-to-day functioning is impaired).

| Mental Wellbeing | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | 10 | Completely |
| ---: | :--- |
| satisfied |

6. How satisfied are you with your knowledge or skills? A score of 10 indicates you have the skills and knowledge to help you solve problems and manage your life. A score of 0 indicates that you lack knowledge or skills to manage your life effectively.

| Knowledge/skills | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
|  | Not at all <br> satisfied |  |  |  |  |  |  |  |  | Completely <br> satisfied |  |

## Instructions

Please circle the number to indicate how satisfied you feel in relation to each of the questions below. Each question is rated on a 0 - to 10 -point scale, with $10=$ a high-level of satisfaction and $0=$ a sense of dissatisfaction.
7. How satisfied are you with your ability to adapt a positive attitude to life? A score of 10 indicates an attitude to life that views challenges as opportunities to be overcome. A score of 0 indicates a tendency to focus on the challenges in life in a negative and overwhelming way.

| Positive attitude | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  |  |  |  |  | etely isfied |

8. How satisfied are you with your ability to be able to bounce back from difficulties in life? A score of 10 indicates a high degree of satisfaction in your ability to overcome challenges and adversity in life. A score of 0 indicates a sense of dissatisfaction in your ability to bounce back from life's challenges or adversity.

| Able to bounce back | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :---: |
|  | Not at all <br> satisfied |  |  |  |  |  |  |  | Completely <br> satisfied |  |  |

9. How satisfied are you with your own sense of self worth? A score of 10 indicates a high level of satisfaction (e.g., you might feel competent, capable, or worthwhile). A score of 0 indicates a sense of dissatisfaction (e.g., you might feel incompetent, lacking worth, or an inability to make a contribution to the world).

| Self Worth | 0 1 2 3 4 5 6 | 7 | 8 | 9 | 10 |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
|  | Not at all <br> satisfied |  |  |  |  |  |  |  |  | Completely <br> satisfied |

## Instructions

Please circle the number to indicate how satisfied you feel in relation to each of the questions below. Each question is rated on a 0 - to 10 -point scale, with $10=$ a high-level of satisfaction and $0=$ a sense of dissatisfaction.
10. How satisfied are you with your ability to attend to your own recovery? A score of 10 indicates you regularly work on your recovery (e.g., you attend and contribute to a recoverybased group). A score of 0 indicates you are not active on your recovery (e.g., you have little or no contact with a recovery-based group).

11. How satisfied are you with your level of commitment to regular meaningful activity? A score of 10 indicates you regularly engage in meaningful activity, like voluntary or paid work, education or you care for another person. A score of 0 indicates you lack meaningful activity in your life (e.g., you do not work, care for or help others, or you are not in education).

| Meaningful activity | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | 10 |  |  |
| ---: | :--- |
|  | Not at all <br> satisfied |
|  |  |

12. How satisfied are you with your ability to actively learning? A score of 10 indicates you are satisfied by your ability to learn and you continue to do so (e.g., you attend courses). A score of 0 indicates a sense of dissatisfaction with learning (e.g., you do not actively spend time learning).

| Actively learning |  1 2 3 4 5 6 7 | 8 | 9 | 10 |  |  |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :---: |
|  | Not at all <br> satisfied |  |  |  |  |  |  |  |  |  |  |
| Completely |  |  |  |  |  |  |  |  |  |  |  |
| satisfied |  |  |  |  |  |  |  |  |  |  |  |

## Instructions

Please circle the number to indicate how satisfied you feel in relation to each of the questions below. Each question is rated on a 0 - to 10 -point scale, with $10=$ a high-level of satisfaction and $0=$ a sense of dissatisfaction.
13. How satisfied are you with your social networks (e.g., your relationships to friends, colleagues, group members, peers)? A score of 10 indicates satisfaction with the number and quality of these contacts. A score of 0 indicates dissatisfaction from having too few and/or poor quality contacts.

| Social Networks | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :---: |
|  | Not at all <br> satisfied |  |  |  |  |  |  |  |  |  |  |
| Completely |  |  |  |  |  |  |  |  |  |  |  |
| satisfied |  |  |  |  |  |  |  |  |  |  |  |

14. How satisfied are you with the quality of your family relationships? A score of 10 indicates a high level of satisfaction (e.g., you securely connected to members of your family or you are satisfied with the level of your relationships or connections with them, even if there is little or no contact). A score of 0 indicates a sense of dissatisfaction or disconnection with family members.

|  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | 10 | Family |
| ---: |
|  |
|  |
|  |
|  |
| Not at all |
| satisfied |

15. How satisfied are you with your the quality of your relationship to a partner or if you have no partner your general satisfaction with this area of your life? A score of 10 indicates a high level of satisfaction (e.g., you have a satisfying relationship or you are content to be without a partner at the moment). A score of 0 indicates a sense of dissatisfaction or disconnection (e.g., your relationship is not satisfying or you are lonely).

| Partner | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
|  | Not at all <br> satisfied |  |  |  |  |  |  |  |  | Completely <br> satisfied |  |
|  |  |  |  |  |  |  |  |  |  |  |  |

J. Word Count Statement

Thesis Abstract: 241

Chapter 1 - Systematic Review
Abstract: 179

Main text (excluding abstract and keywords, tables, figures and references): 4946 Tables, figures and references: 2879

Chapter 2 - Empirical Study
Abstract: 220
Main text (excluding abstract and keywords, tables, figures and references): 3891 Tables, figures and references: 1426

Chapter 3 - Contributions to Theory and Clinical Practice
Main text (excluding references): 2725
References: 987

Appendices: 3321

## Overall Thesis

Total word count (excluding tables, figures, references and appendices): 11956
Total word count of tables, figures, references and appendices: 8613
Total thesis word count (including acknowledgements, declaration, table of contents, thesis abstract, title pages, tables, figures, references, and appendices): 21507

