Healthy LIVing

Quality of life with HIV webinar series

Management of Sleep Quality in People Living with HIV

From assessment to successful strategies

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This meeting has been organised and sponsored by MSD

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Management of Sleep Quality in People Living with HIV

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Quality of life with HIV webinar series

Prevalence of Sleep Disturbances and its impact on People living with HIV

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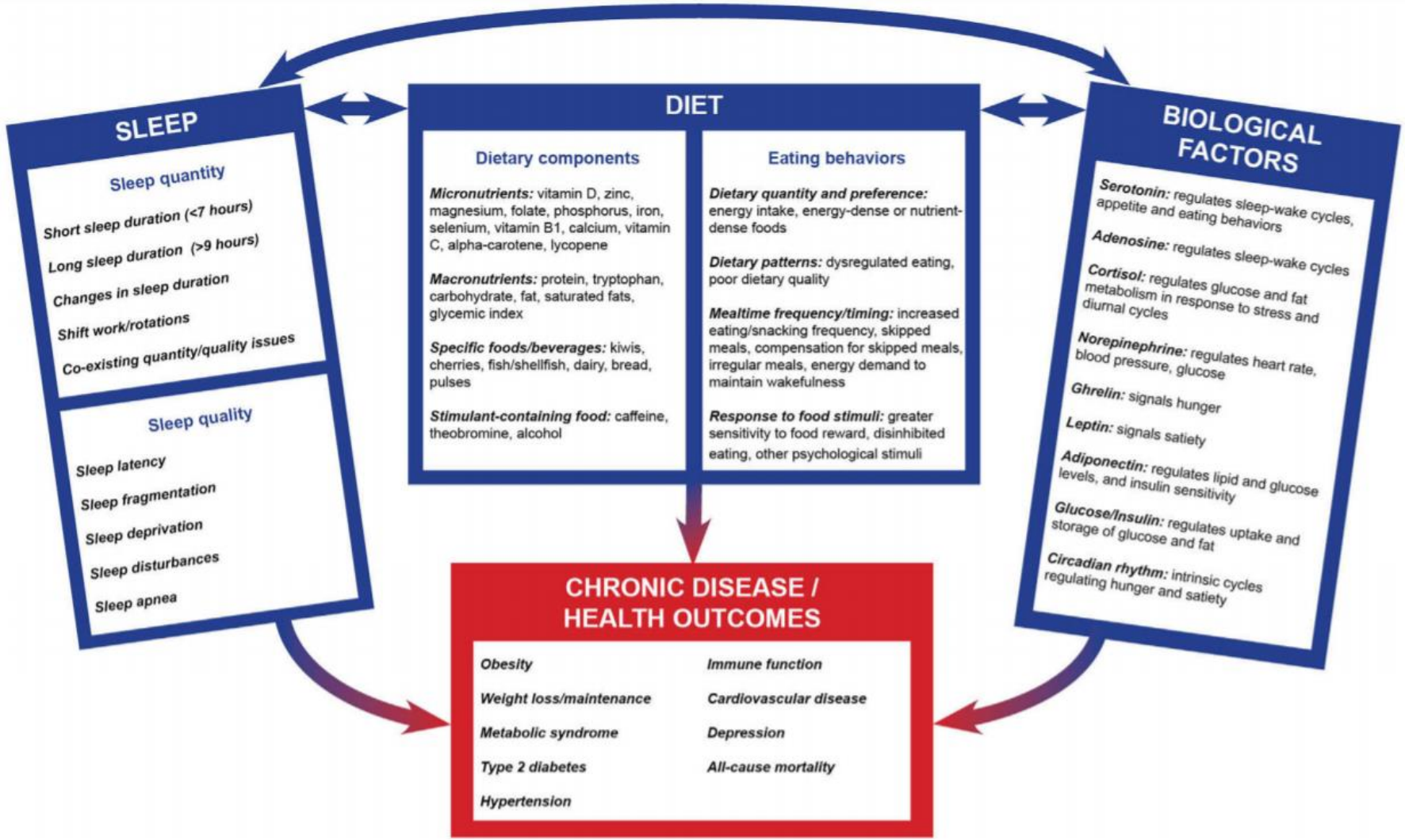
Overview

1. The theories of sleep – A brief reminder
2. What is poor sleep? And how is it measured?
3. Sleep disturbance in the non-HIV population
4. Sleep disturbance in the HIV population
5. Summary remarks

Why Do We Need To Sleep?

Image sourced from Andrewson N. 'Why do we need to sleep', The Atlantic (2018). Available online: https://www.theatlantic.com/science/archive/2018/01/the-mystery-of-sleep-pressure/549473/.
Last accessed: July 2021.

What Influences Sleep and Wake?



Imaged sourced from Frank, S. Diet and Sleep Physiology: Public Health and Clinical Implications, Front. Neurol. 2017;8:393.

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How Might Sleep Deprivation Affect Daytime Function and Mental Health?

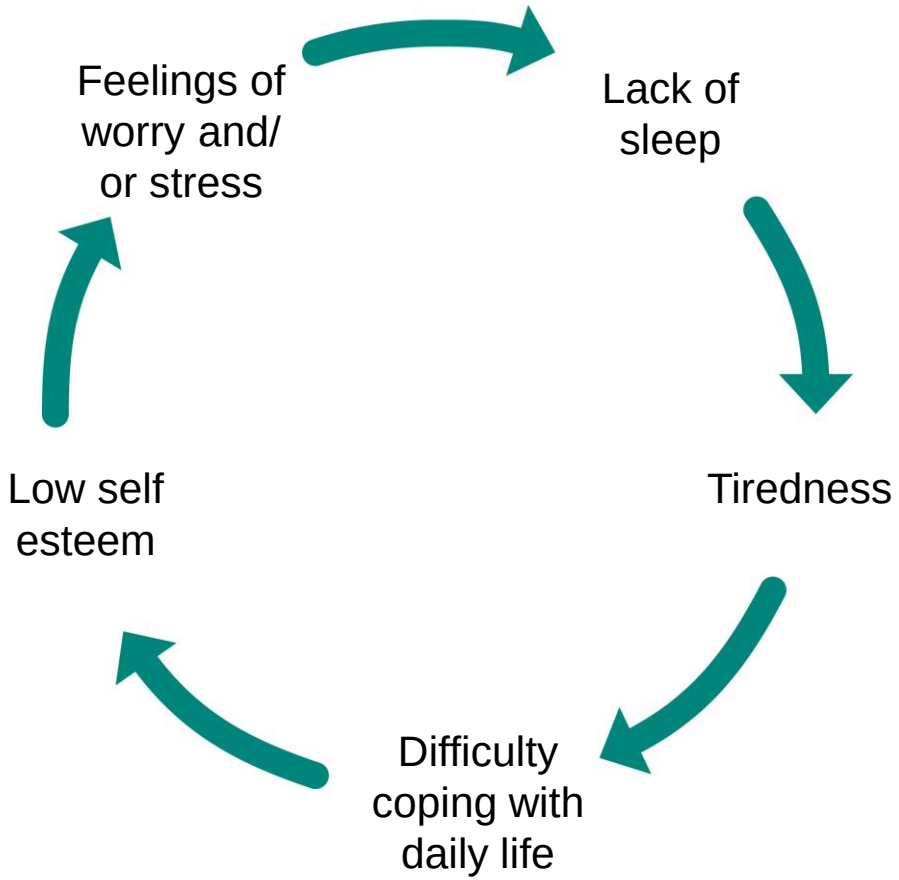

Image sourced from www.mind.org.uk. Last accessed July 2021.

How Much Sleep Experts Say You Need

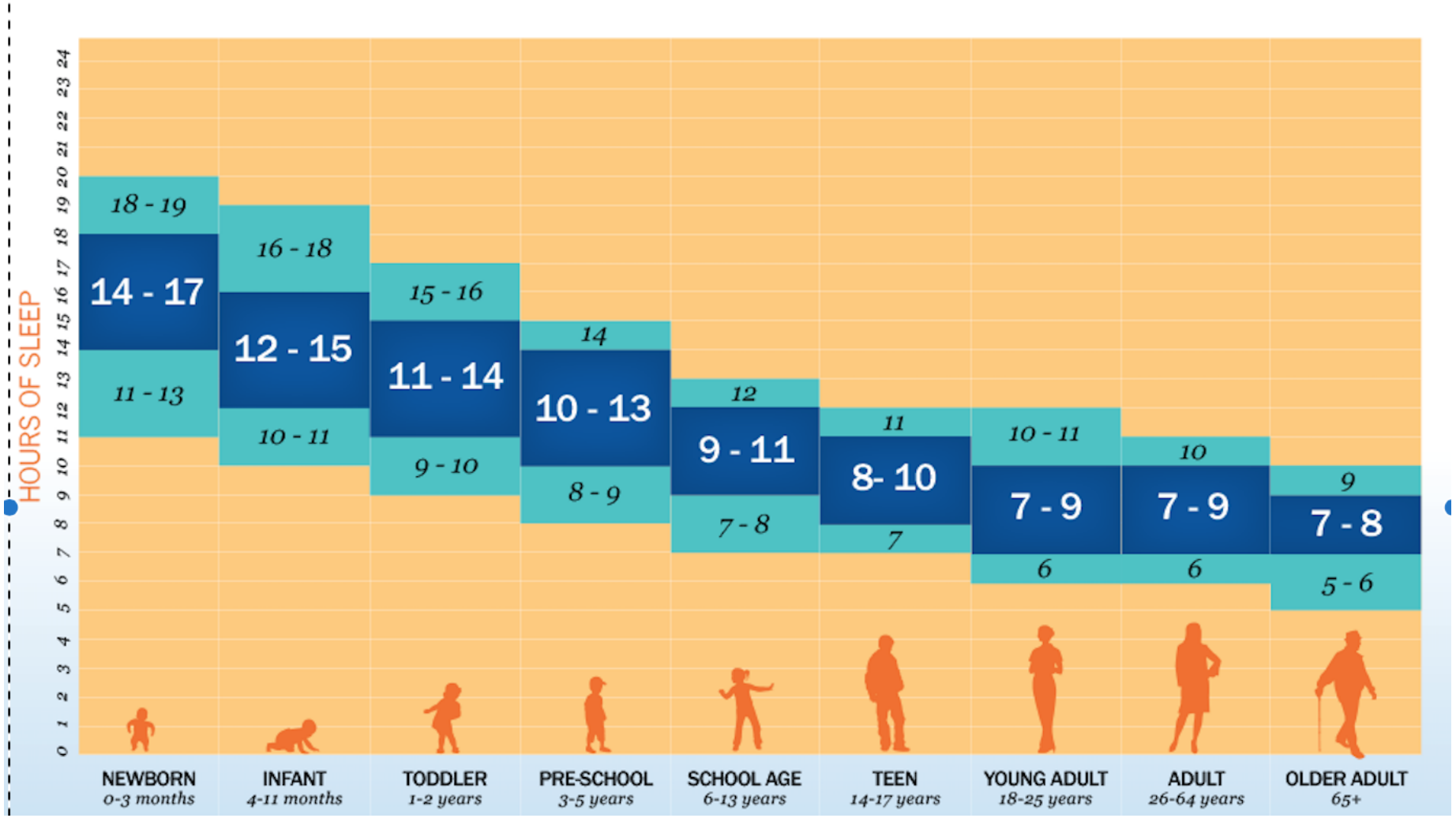

Image sourced from Hirshkowitz M, et al. The National Sleep Foundation's sleep time duration recommendations: methodology and results summary, Sleep Health, 2015;1(1):40–43.

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What does poor Sleep mean? How is it measured?

- What do we mean by Poor Sleep ?
- How is Poor Sleep ascertained ?
- What are relevant Functional outcomes of Poor Sleep ?

Sleep Disturbance

- Duration of sleep – sleep opportunity
- Sleep fragmentation – sleep confounders
  - Environment, preparation, pain, reflux, light, sound, etc
- Insomnia – initiation, maintenance
- Other sleep disorders:
  - Sleep disordered breathing
  - Nocturnal movement related disorders (RLS, PLMD)
  - Parasomnias (REM Behaviour Disorder, somnambulism, etc)

RLS: Restless Leg Syndrome, PLMD: Periodic limb movement disorder, REM: Rapid eye movement

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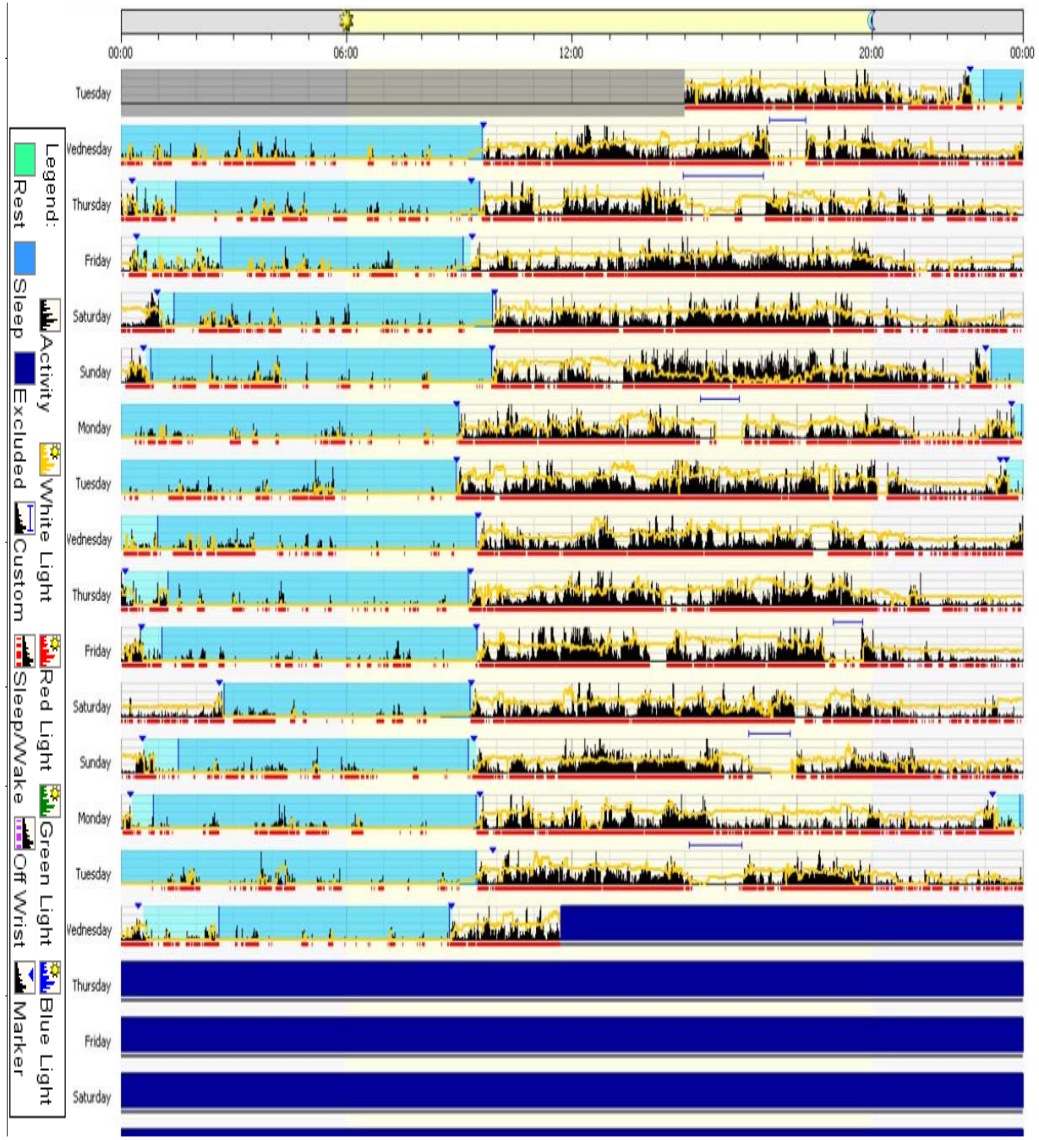
Sleep Disturbance

- How should it be measured?
  - Ever, sustained, recent or past

- Objective measures vs. subjective tools
  - Actigraphy – movement = wakefulness
  - Polysomnography – sleep stages, arousals, efficiency etc
  - Subjective self-reported questionnaires

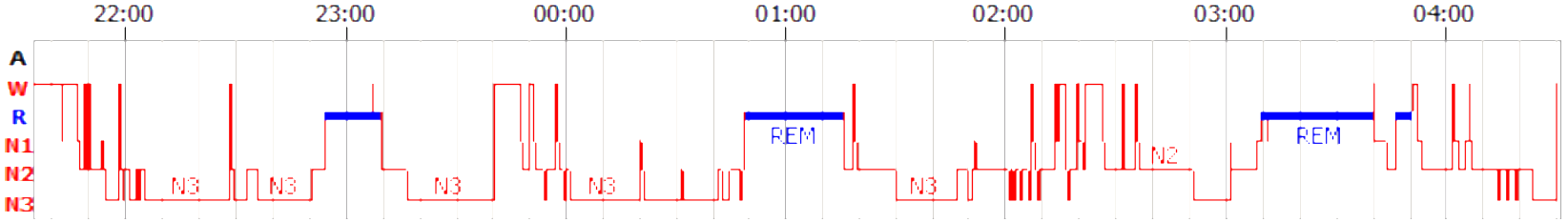
Sleep Disturbance: Example of a 2 week actigraph trace.



1. Example of a 2 week actigraph trace. Speakers own image.

Sleep Disturbance: Example of a report of single night Polysomnography

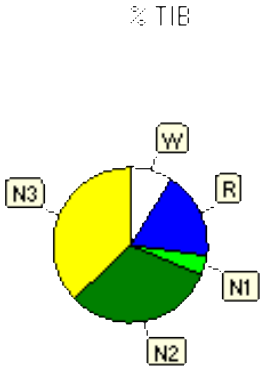
Sleep Stages



	from	to	Artefact	Duration
Recorded Time	21/07/2020 20:57:00	22/07/2020 05:57:00		09:00:00
TIB	21/07/2020 21:34:45	22/07/2020 04:30:10	-	06:55:25

Total Sleep Time (TST)	06:20:00
Sleep Efficiency [%]	**91.5**
Sustained Sleep Eff. [%]	93.2
Sleep Latency [m]	**7.7**
Sleep Latency N1 [m]	**7.7**
Sleep Latency N2 [m]	**12.8**
Deep Sleep Latency [m]	**19.8**
REM latency [m]	71.5
Total Sleep Period (SPT)	06:47:30
Sleep Stage Change (Index)	126 (18.2)
# Wake (Index)	**22 (3.5)**
# Wake > 3 min (Index)	**3 (0.5)**
#Wake respiratory (Index)	2 (0.3)
Wake duration SPT	**00:27:30**
REM Density [%]	1
WASO	00:27:40

Sleep Stage	Duration	(%) TIB	(%) TST	(%) SPT
Artefact	00:00:00	0	**0**	**0**
Movement	00:00:00	0	**0**	**0**
Wake	00:35:25	8.5	**0**	**6.7**
REM	01:17:00	18.5	**20.3**	**18.9**
N1	00:17:30	4.2	**4.6**	**4.3**
N2	02:11:30	31.7	**34.6**	**32.3**
N3	02:34:00	37.1	**40.5**	**37.8**
Light Sleep	02:29:00	35.9	**39.2**	**36.6**
Deep Sleep	02:34:00	37.1	**40.5**	**37.8**



REM: Rapid eye movement, WASO: Wake after sleep onset

1. Example of a report of single night Polysomnography. Speakers own image.

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Sleep Measurement Tools

Questionnaire	Process	Main Domains	Recall Period	Number of Questions	Time to Complete (min)	Scores
PSQI	Self-reported 0–3 Likert scale	Sleep quality, sleep disturbance, and sleep habits	1 month	19	5–10	Score of 5 or more indicates poor sleep quality. Global score calculated by summing subscale scores (not calculated for individuals with missing results).
ESS	Self-reported 0–3 Likert scale	Level of sleepiness/ propensity of falling asleep	N/A	8	< 5	≥11 indicates excessive daytime sleepiness
FOSQ	Self-reported 0–4 Likert scale	Functional impairment in activities of daily living resulting from sleepiness	N/A	30	15	5 domains: for each domain, lower scores indicate more acute issues. Each domain score calculated by averaging answered domain questions. Global score calculated by averaging the subscale scores & multiplying by 5 (allows for missing subscale scores).

1. Elliot ER, Wang X, Singh S, Simmons B, Vera JH, Miller RF, Fitzpatrick C, Moyle G, McClure M, Boffito M. Clin Infect Dis. 2019 Jan 1;68(1):87-95

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Sleep Measurement Tools

ISI	Self-reported 0–4 Likert scale	Nature, severity, and impact of insomnia	2 weeks	7	<5	0–7 no insomnia; 8- 14 subthreshold insomnia; 15–21 moderate insomnia; 22–28 severe insomnia
FSS	Self-reported 1–7 Likert scale	Effect of fatigue on motivation, exercise, physical, social, and family functioning	1 week	9	<5	>5 indicates abnormal fatigue
SDQ	Self-reported 1–5 Likert scale	Sleep quality; sleep disturbance; daytime function; medication; medical family history	6 months	175	30	4 sleep disorders categories: sleep apnoea syndrome, narcolepsy, periodic limb movements disorders, and psychiatric sleep disorders.
Cogstate neurocognitive test	Computerized battery	Detection; identification; set shifting; Groton Maze learning; Groton Maze secall; 1 card learning; 1 back memory; 2 back memory	N/A	8 tasks		Score provided for each of 8 domains using optimal outcome measure (as defined by Cogstate guidelines). Composite score for change from baseline calculated by averaging standardized change scores.

Abbreviations: ESS, Epworth Sleepiness Scale; FOSQ, Functional Outcomes of Sleep Questionnaire; FSS, Fatigue Severity Scale; ISI, Insomnia Severity Index; PSQI, Pittsburgh Sleep Quality Index; SDQ, Sleep Disorder Questionnaire.

1. Elliot ER, Wang X, Singh S, Simmons B, Vera JH, Miller RF, Fitzpatrick C, Moyle G, McClure M, Boffito M. Clin Infect Dis. 2019 Jan 1;68(1):87-95

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Sleep Disturbance in the non-HIV Population

- **10–20%** of general population (primary care) – insomnia[1,2]
- **50%** of older people report sleep disturbance[3]
- Include sleep disturbance (PSQI) in illness[4]
  - Physical – cancer, autoimmune, multiple sclerosis
  - Refugees
  - Psych – dementia, mental health (anxiety, depression, suicide risk)

PSQI: Pittsburgh Sleep Quality Index

1. Morphy H, et al. Epidemiology of insomnia: a longitudinal study in a UK population. Sleep 2007;30:274–280.
2. LeBlanc M, et al. Incidence and risk factors of insomnia in a population-based sample. Sleep 2009; 32:1027–1037.
3. Wennberg AM et al. Semin Neurol. 2017 Aug;37(4):395-406.
4. Pigeon, W. R.et al . Meta-analysis of sleep disturbance and suicidal thoughts and behaviours. The Journal of Clinical Psychiatry 2012, 73(9), e1160–e1167.

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Sleep Disturbance in the non-HIV Population

Prevalence of self-reported suboptimal sleep in Australia and receipt of sleep care: results from the 2017 National Social Survey [n=1,265]

NSF criteria for categorising sleep parameters as 'appropriate', 'may be appropriate' and 'suboptimal', according to age

Sleep parameter	Age	Appropriate	May be appropriate	Suboptimal
Sleep duration (hours)	18-25	7-9	6, 10-11	< 6, >11
	26-64	7-9	6, 10	< 6, >10
	65+	7-8	5-6, 9	<5, >9
Sleep onset latency (minutes)	18-25	≤30	>30 ≤45	>45
	26-64	≤30	>30 ≤45	>45
	65+	≤30	>30 ≤60	> 60
Awakenings (>5min)	18-25	≤1	>1 ≤3	>3
	26-64	≤1	>1 ≤3	>3
	65+	≤2	>2 ≤3	>3
Wake after sleep onset (minutes)	18-25	≤20	>20 ≤40	>40
	26-64	≤20	>20 ≤40	>40
	65+	≤30	>30	N/A
Sleep efficiency (%)	18-25	≥85	<85 ≥65	<65
	26-64	≥85	<85 ≥75	<75
	65+	≥85	<85 ≥75	<75
Naps per day (n)	18-25	0	1-2	>2
	26-64	N/A	0-3	>3
	65+	N/A	0-3	>3
Nap duration (minutes)	18-25	N/A	0-100	>100
	26-64	N/A	0-100	>100
	65+	N/A	0-100	>100
Nap frequency (days)	18-25	0	≥1	N/A
	26-64	N/A	N/A	N/A
	65+	N/A	N/A	N/A

N/A: not applicable; no: 'suboptimal' criteria

Results: Almost half of participants (42%) were considered to have suboptimal sleep: 19% met criteria on one parameter, 13% on 2, 11% on ≥3. The highest prevalence of suboptimal sleep was seen on measures of sleep duration (20%-23%). Participants who were single, female, middle-aged (26-64) and of low socioeconomic status were more likely to experience suboptimal sleep ($p<0.01$). Rates of assessment and treatment are currently suboptimal: 16% reported their sleep had been assessed and 10% received at least one element of sleep care, most commonly pharmacotherapy (43%).
Conclusions: Suboptimal sleep is prevalent in Australia, and rates of assessment and treatment are currently low. Finding supports the need for a coordinated population health strategy to improve the sleep health of Australians.

National Sleep Foundation (NSF) criteria – appropriate, suboptimal, inappropriate.

- **42%** report suboptimal sleep
- **20-23%** report sleep opportunity reduction
- Higher in single middle-aged women, lower socioeconomic status
- Only **16%** have had assessments for sleep
- Therapies are pharmaceutical in **43%**

NOTE: NOT assessing impact of sleep disturbance

Image sourced from Metse, AP et al. Prevalence of self-reported suboptimal sleep in Australia and receipt of sleep care: results from the 2017 National Social Survey. Sleep Health. 2020 Feb;6(1):100-109.

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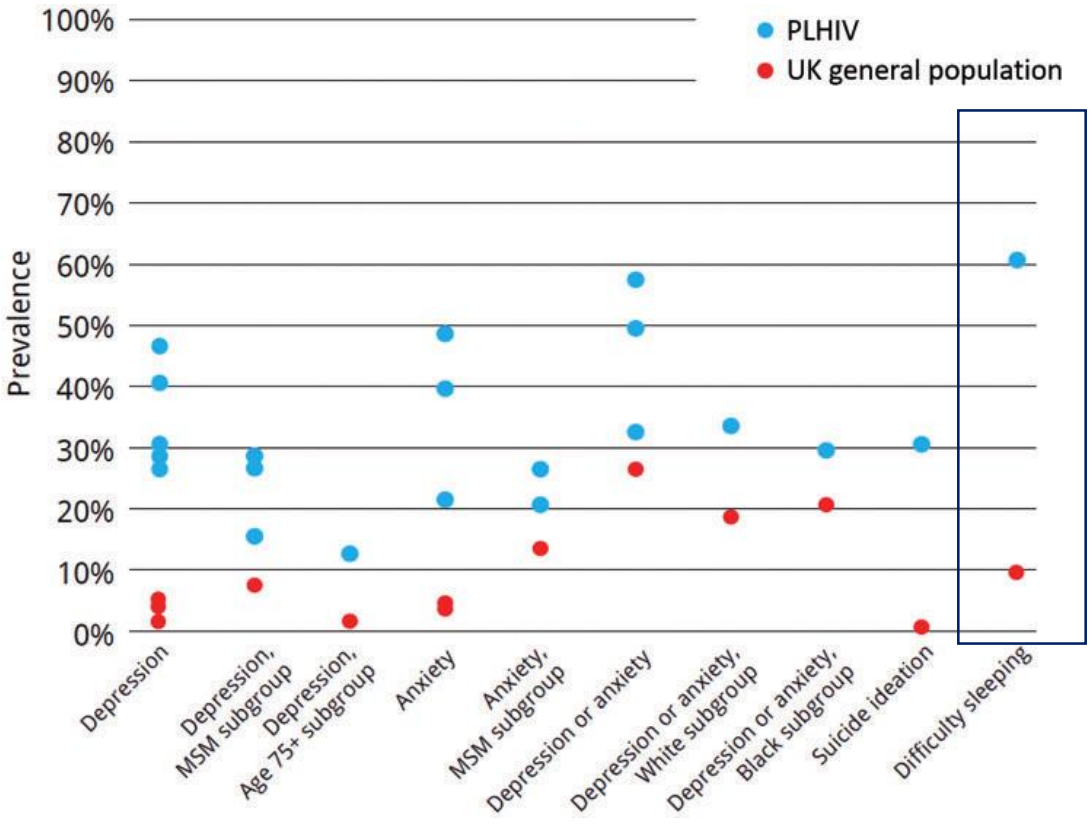
Sleep Disturbance in the non-HIV and HIV Population

Systematic review of the prevalence of psychiatric illness and sleep disturbance as co-morbidities of HIV infection in the UK



Difficulty sleeping: 61% vs 10%

McGowan J, Sherr L, Rodger A, et al. Effects of age on symptom burden, mental health and quality of life amongst people with HIV in the UK, http://www.jiasociety.org/index.php/jias/article/view/19511 (2014, accessed 1 April 2015).

Decision Resources Group (DRG). Insomnia epidemiology report, https://decisionresourcesgroup.com/get-the-report/75472-biopharma-insomnia-epidemiology-mature-markets-data/ (2015, accessed 23 March 2017).

1. Image sourced from Chaponda M, Aldhouse N, Kroes M, Wild L, Robinson C, Smith A. Systematic review of the prevalence of psychiatric illness and sleep disturbance as co-morbidities of HIV infection in the UK. Int J STD AIDS 2018;29(7):704-713.

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Sleep Disturbance in the HIV Population

Multimodality assessment of sleep outcomes in people living with HIV performed using validated sleep questionnaires

- **254 people** living with HIV from 56 Dean St clinic
- **99%** male, **88%** white, urban
- Age 41 +/- 9.9y
- 8y +/- 6.6y LHIV, 94% art, mean CD4 = 724, 81% VL<40
- **72%** University, **60%** chemsex drugs

- 8 validated self-reported questionnaires:
  - FOSQ – sleep and impact
  - PSQI, ISI, ESS – sleep, insomnia, sleepiness
  - FSS, GAD, PHQ – fatigue, anxiety, depression
  - WT – wellness thermometer

Studies conducted in people living with HIV (PLHIV) report high rates of sleep disturbance, without a clear explanation as to cause or effect. Therefore, we proposed use of multiple validated questionnaires that would allow a more comprehensive evaluation of sleep quality in PLHIV. We administered eight validated sleep and wellbeing questionnaires, recording different aspects of sleep, in order to provide a comprehensive description of sleep quality, quantity, daytime functioning, wakefulness, and general wellbeing. Associations with demographics and clinical data were analyzed by univariable/multivariable analyses. Of 254 subjects 99% were male (98% men who have sex with men), 88% white, mean age 41 (SD ± 9.9) years, HIV duration eight years (SD ± 6.3), 94% were on antiretroviral therapy, mean CD4 cell count was 724 cells/mm^3, 81% had HIV RNA <40 copies/ml, 72% were university educated, and 60% used ‘chemsex’ drugs. Almost half (45%) reported poor sleep quality, 22% insomnia, 21% daytime sleepiness, and 33% fatigue. As individual factors, HIV duration ≥10 years, anxiety, depression, and recreational drug use were associated with poor quality sleep, fatigue, and poorer functional outcomes ($p \leq 0.05$). The prevalence of sleep disturbance was high in our cohort of PLHIV. Sleep disturbance was associated with longer duration of HIV infection, depression, anxiety, and recreational drug use.

1. Milinkovic, A , Singh S, Simmons B, Pozniak A, Boffito, M and Nwokolo N. Multimodality assessment of sleep outcomes in people living with HIV performed using validated sleep questionnaires. International Journal of STD & AIDS. 2020;31(10):996-1003.

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Sleep Disturbance in the HIV Population

Multimodality assessment of sleep outcomes in people living with HIV performed using validated sleep questionnaires

Table 1. Sleep and quality of life characteristics.

Characteristics	Total (n = 254)
Patient characteristics	
Age (years)	40.8 (9.9)
Male	253 (99.6%)
MSM	250 (98.4%)
White ethnicity	221 (87.7%)
British origin	147 (57.9%)
Employed	219 (86.9%)
University educated	183 (72.0%)
Tobacco smoking (current)	61 (24.6%)
Alcohol drinking (>once/week)	105 (41.7%)
Recreational drug use in past six months	150 (60.7%)
Crystal methamphetamine	52 (20.7%)
Mephedrone	72 (29.3%)
Cocaine	59 (24.0%)
Ketamine	20 (8.2%)
GBL, GHB	67 (27.1%)
MDMA	43 (17.4%)
Amyl nitrate	81 (33.1%)
Cannabis	58 (23.4%)
STIs within previous six months	77 (30.6%)
HIV characteristics	
Time since HIV diagnosis (years)	8.1 (6.3)
HIV RNA <40 copies/ml	199 (80.9%)
CD4 cell count (cells/mm^3)	723.6 (493.2)
ART category	
2NRTI+1NNRTI (with EFV)	60 (24.2%)
2NRTI+1NNRTI (without EFV)	37 (14.9%)
2NRTI+1PI	42 (16.9%)
2NRTI+1INSTI	81 (32.7%)
Other	14 (5.6%)
No ART	14 (5.6%)
Sleep characteristics from questionnaires	
Functional outcomes of sleep questionnaire (FOSQ; $\alpha = 0.86$), n = 222	
Global score (5–20)	17.0 (2.9)
Pittsburgh Sleep Quality Index (PSQI; $\alpha = 0.77$), n = 233	
Global score (0–21)	5.9 (3.7)
PSQI >5 (poor quality sleep)	104 (44.6%)
Insomnia Severity Index (ISI; $\alpha = 0.92$), n = 177	
Moderate insomnia (15–21)	31 (17.5%)
Severe insomnia (≥22)	8 (4.5%)
Epworth Sleepiness Scale (ESS; $\alpha = 0.76$), n = 241	
Sleepiness (10–17)	45 (18.7%)
Severe sleepiness (≥18)	5 (2.1%)
Fatigue Severity Scale, n = 245	
Possible fatigue (≥36)	82 (33.5%)
Mental health and quality of life characteristics	
Generalized Anxiety Disorder (GAD; $\alpha = 0.90$), n = 241	
Mild anxiety (5–9)	67 (27.8%)
Moderate anxiety (10–14)	22 (9.1%)
Severe anxiety (≥15)	11 (4.6%)
Patient Health Questionnaire (PHQ; $\alpha = 0.88$), n = 241	
Mild depression (5–9)	75 (31.1%)
Moderate depression (10–14)	24 (10.0%)
Severe depression (≥15)	21 (8.7%)
Wellness thermometer, n = 245	
Wellness score (1–10)	6.7 (2.2)

1. Milinkovic, A , Singh S, Simmons B, Pozniak A, Boffito, M and Nwokolo N. Multimodality assessment of sleep outcomes in people living with HIV performed using validated sleep questionnaires. International Journal of STD & AIDS. 2020;31(10):996-1003.

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Sleep Disturbance in the HIV Population

- **45%** sleep disturbance in people living with HIV
  - Mainly white, male, middle class, educated, controlled HIV for ~ 8 years and high use of chemsex drugs
- **17.5%** moderate insomnia, **4.5%** severe insomnia
- Generally good daytime function – functional outcomes of sleep questionnaire (FOSQ) - 17
- Consistent internal validation and with previous studies
- Increase associations with anxiety, depression (especially Epworth sleepiness scale, fatigue)

1. Milinkovic, A , Singh S, Simmons B, Pozniak A, Boffito, M and Nwokolo N. Multimodality assessment of sleep outcomes in people living with HIV performed using validated sleep questionnaires. International Journal of STD & AIDS. 2020;31(10):996-1003.

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Sleep Disturbance in the HIV Population

Predictors of poor sleep or wellbeing:

- Poorer functional outcomes if depression, HIV ≥10 years vs <5 years
- Poorer sleep quality if HIV ≥10 years vs <5 years (or 3), moderate-severe anxiety (or 5.8), depression (or 7.9)
- More fatigue and sleepiness if depression (or 8.2 mild, 18.4 moderate-severe)
- Better functional outcomes for university vs school education

Wellness thermometer:

- Better if in employment
- Worse if poor sleep quality and chemsex drug use

1. Milinkovic, A , Singh S, Simmons B, Pozniak A, Boffito, M and Nwokolo N. Multimodality assessment of sleep outcomes in people living with HIV performed using validated sleep questionnaires. International Journal of STD & AIDS. 2020;31(10):996-1003.

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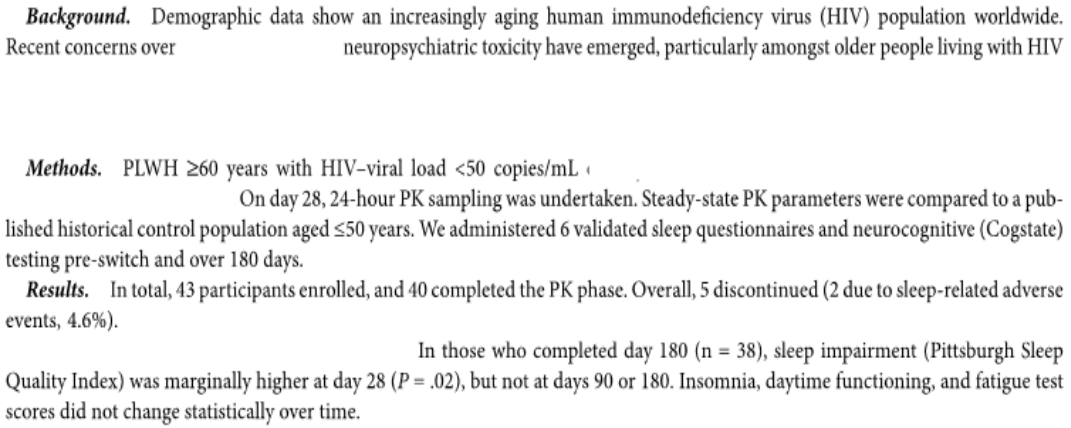
Sleep Disturbance in the HIV Population

Increased … Peak Concentrations in People Living with HIV Aged 60 and Over, and Analysis of Sleep Quality and Cognition

- In 43 participants age >60 years old PLWH switching ART[1]
- At 180d, Sleep disturbance slightly at day 28 not after. No change in Insomnia, fatigue or daytime function[1].
- Medication change in this senior group did not have lasting Sleep disturbance or impact[1]



Background. Demographic data show an increasingly aging human immunodeficiency virus (HIV) population worldwide. Recent concerns over neuropsychiatric toxicity have emerged, particularly amongst older people living with HIV

Methods. PLWH ≥60 years with HIV-viral load <50 copies/mL ‹
On day 28, 24-hour PK sampling was undertaken. Steady-state PK parameters were compared to a published historical control population aged ≤50 years. We administered 6 validated sleep questionnaires and neurocognitive (Cogstate) testing pre-switch and over 180 days.

Results. In total, 43 participants enrolled, and 40 completed the PK phase. Overall, 5 discontinued (2 due to sleep-related adverse events, 4.6%).
In those who completed day 180 (n = 38), sleep impairment (Pittsburgh Sleep Quality Index) was marginally higher at day 28 (P = .02), but not at days 90 or 180. Insomnia, daytime functioning, and fatigue test scores did not change statistically over time.

1. Elliot ER, Wang X, Singh S, Simmons B, Vera JH, Miller RF, Fitzpatrick C, Moyle G, McClure M, Boffito M. Clin Infect Dis. 2019 Jan 1;68(1):87-95

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Summary

- Sleep disturbance prevalence is reported to be higher in people living with HIV than the general population
- This may not be different to prevalence in patients with other comorbidities
- There is an unclear but definite interaction with mental health domains (bidirectional)
- There is a lack of epidemiological data covering the likely effect and impact
- An area for good quality large data impact (reporting tools? Home Polysomnographic (PSG) value)

Is quality of sleep an issue for people living with HIV and what tools are available to help assess it?

Psychological Problems in People Living with HIV

- Significantly higher rates of mental health problems and diagnoses than general population[1,2]
- Higher depression, anxiety & adjustment disorders than other mental health problems[3]
- Twice as likely to be diagnosed with depression than general population[4]
- Chemsex significantly higher among gay men with HIV, challenges HIV care[5,6]

Depression, drugs, anxiety can impair sleep: trouble falling / staying asleep or sleeping too much

1. Harding, R. Lampe, F. C, Norwood S et al (2010) Symptoms are highly prevalent among HIV outpatients and associated with poor adherence and unprotected sexual intercourse. Sex Transmitted Infections, 86, 520–524. 2. Shiau, S, Krause, K. D, Valera, P, Swaminathan, S, Halkitis P.N (2020) The burden of COVID-19 in people living with HIV: a syndemic perspective. AIDS Behaviour, 24(8), 2244–9. 3. Adams, C, Zacharia, S, Masters, L, Coffey, C, Catalan, P. (2016) Mental health problems in people living with HIV: changes in the last two decades: the London experience 1990-2014. AIDS Care, 28(Suppl 1), 56–59. 4. Ciesla, J.A, Roberts, J.E. (2001) Meta-analysis of the relationship between HIV infection and risk for depressive disorders. American Journal of Psychiatry, 158: 725–730. 5. Bourne, A, Reid, D, Hickson, F, Rueda, A.T, Weatherburn, P. (2014) The Chemsex Study: drug use in sexual settings among gay and bisexual men in Lambeth, Southwark & Lewisham. London: Sigma Research, London School of Hygiene & Tropical Medicine. Available at: https://researchonline.lshtm.ac.uk/id/eprint/2197245. Last accessed: July 2021. 6. Bourne, A. (2012). Drug use among men who have sex with men: Implications for harm reduction. In: Stoicescu C (ed). Global State of Harm Reduction Towards an integrated reduction. London: Harm Reduction International. Available at: https://sigmaresearch.org.uk/files/Chapter_3.3_MSM_.pdf. Last accessed: July 2021.

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Psychological Problems in People Living with HIV

- HIV+ diagnosis: traumatic, resembles grief process[1]
- Being HIV+ and HIV stigma: identity, can affect adjustment and self-esteem[2,3]
- Co-morbid: pre-existing mental / physical health
- Disclosure: relationships, sex
- Medication: starting, changing, adhering, side effects
- Major life decisions: work, marriage, pregnancy, etc. complicated by HIV illness?
- Long-term issues: illness, hospitalisation, cognitive impairment, palliative

All the above can lead to poor mental health and impair sleep

1. Kübler-Ross, E (1969) On Death and Dying. New York, USA: Macmillan. 2. Rohleder, P, Campbell, T, Matthews, A, Petrak, J (2013) HIV in the UK, The Psychologist; 26: 504–507.
3. The British Psychological Society. Clinical Psychology Services in HIV and Sexual Health: A Guide for Commissioners of Clinical Psychology Services. Leicester: BPS, 2002.

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Sleep Problems

Sleep problems are more common in PLWH than the general population but prevalence range depends on definition and methodology[1]

Definitions[2]

Sleep quality: measurement of how well one is sleeping—restful / restorative

Sleep satisfaction: how one feels about their sleep

Insomnia: difficulty falling / staying asleep

Sleep quantity: measures how much sleep a person gets each night

1. Reid, S, Dwyer, J (2005) Insomnia in HIV infection: a systematic review of prevalence, correlates, and management. Psychosom Med, 67(2): 260–269. 2. Sleep Foundation. How to determine poor quality sleep. Available at: https://www.sleepfoundation.org/sleep-hygiene/how-to-determine-poor-quality-sleep. Last accessed June 2021.

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Sleep Problems in People Living with HIV

- High prevalence in PLWH: ranging from **30%** to **100%.** 100% for PLWH with cognitive impairment[1]
- High prevalence of poor sleep quality (**73%)** and insomnia (**52%)**[2]
- Another study with 290 PLWH:[3]
  - **56%** had fragmented sleep, **45%** slept < 6h per night
  - **34%** had difficulty falling asleep, **20%** had both difficulty / fragmented sleep
  - **30%** were good sleepers

1. Rubinstein, M. L, Selwyn, P. A (1998). High prevalence of insomnia in an outpatient population with HIV infection. J Acquir Immune Defic Syndr Hum Retrovirol, 19(3): 260–265. 2. Gutierrez,J, Tedaldi, T.M., Armon, C., Patel, V., Hart, R., Buchacz, K. (2019) Sleep disturbances in HIV-infected patients associated with depression and high risk of obstructive sleep apnea. Sage Open Medicine, 7:1-11.
3. Lee., K, A., Gay, C., Portillo, C, J., Coggins, T., Davis, H., Pullinger, C.R., Aouizerat, B. E. (2012). Types of Sleep Problems in Adults Living with HIV/AIDS. Journal of Clinical Sleep Medicine, 8:1.

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Sleep Problems in People Living with HIV

- Not clear whether sleep problems are related to infection, side effects of meds, combination?
- Psychosocial factors significantly impact quality of sleep
- Depression, anxiety, stress, substance abuse, poverty, ART medication, lack of family/social support and internalised HIV stigma are all associated with poor sleep quality[1-3]

1. Low Y, Preud'homme X, Goforth HW, et al (2011). The association of fatigue with depression and insomnia in HIV-seropositive patients: a pilot study. Sleep, 34(12): 1723–1726. 2. Fekete, E.M., Williams, S. W., Skinta, M D. (2017) Internalised HIV-stigma, loneliness, depressive symptoms and sleep quality in people living with HIV. Psychology Health, 33, 398 – 415. 3. Ren, J, Zhao, M, Liu, B, Wu, Q, Hao, Y, Jiao, M, Qu, L, Ding, D, Ning, N, Kang, Z, Liang, L, et al (2018). Factors associated with sleep quality in HIV. J Assoc Nurses AIDS Care, 29(6):924-31.

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Sleep and COVID-19

Systemic review: >54,000 patients across 13 countries: prevalence of sleep problems during COVID-19 is high, affecting approx. 40% of people from general and health population[1]

- Studies of COVID-19 impact on PLWH are ongoing
- COVID-19 in PLWH is associated with an increased risk of developing stress, depression, anxiety, loneliness and insomnia[2-4]

Factors of COVID-19-related sleep problems reported in our cohort include:

- Increased stress, anxiety, depression, loneliness
- Changes to routine and diet
- Being stuck at home, less exercise, napping more

1. Jahrami, H., baHammam, A, S., Bragazzi, N, L., Saif Z., Faris, M., Vitiello, M. (2021) Sleep problems during the COVID-19 pandemic by population: a systematic review and meta-analysis. Journal of Clinical Sleep Medicine, 17:2. 2. Zhao, H, He, X, Fan, G, Li, L, Huang, Q, Qiu, Q, et al. (2020) COVID-19 infection outbreak increases anxiety level of general public in China: involved mechanisms and influencing factors. Journal of Affective Disorders, 276:446–52. 3. Peng, M, Mo, B, Liu, Y, Xu, M, Song, X, Liu, L, et al (2020) Prevalence, risk factors and clinical correlates of depression in quarantined population during the COVID-19 outbreak. Journal of Affective Disorders, 275:119–24. 4. Sun, S., Hou, J., Chen, Y., Lu, Y., Brown, L., Operario, D. (2020) Challenges to HIV Care and Psychological Health During the COVID-19 Pandemic Among People Living with HIV in China. AIDS and Behavior, 24:2764–2765.

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Other Reasons for Poor Quality Sleep?

- Trauma and other world events (pandemic, BLM, racism, homophobia)
- Chronic health conditions: asthma, cancer, chronic fatigue, pain, sleep apnoea[1]
- Medication
- Lack of routine and / or shift work
- Poor sleep hygiene i.e., use of caffeine / alcohol before bed

1. https://www.sleepfoundation.org/sleep-hygiene/how-to-determine-poor-quality-sleep (accessed on 23rd June 2021)

Assessing for Sleep Problems

- Despite high prevalence, sleep disorders remain largely underdiagnosed and undertreated in PLWH[1]
- There are currently no standards of practice for treating insomnia in PLWH

Not addressing sleep issues can have a significant impact on quality of life, medication adherence, health outcomes, and cognitive functioning[2]

1. Gutierrez,J, Tedaldi, T.M., Armon, C., Patel, V., Hart, R., Buchacz, K. (2019) Sleep disturbances in HIV-infected patients associated with depression and high risk of obstructive sleep apnea. Sage Open Medicine, 7, 1-11
2. Babson, K.A, Heinz, A.J, Bonn-Miller, M.O. (2013). HIV medication adherence and HIV symptom severity: the roles of sleep quality and memory. AIDS Patient Care STDS, 27(10): 544–552

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Screening for Sleep Problems

- Routine screening for self-reported sleep problems, psychosocial factors (i.e., depression, anxiety) and modifiable factors (i.e., sleep hygiene) should be the norm

- We can ask simple questions:[1]
  - Are you having difficulty getting to sleep and / or staying sleep?
  - Do you have this problem most nights?
  - Is it persistent and affecting you during the day?

- Administer one validated tool such as:
  - Insomnia Severity Index (ISI):[2] 7-item assessing nature, severity and impact of insomnia
  - Sleep Condition Indicator (SCI-02):[3]
    1. Thinking about the past month, to what extent has poor sleep troubled you (0-4)
    2. In the last month, how many nights a week do you have a problem with your sleep? (1-7)

1. Siriwardena, N. (2020) Key learning points: BAP insomnia and sleep disorders. Guidelines in Practice, 23:1. 2. Bastien, C., Vallieres, A., Morin, C. (2001) Validation of the Insomnia Severity Index as an outcome measure for insomnia research. Sleep Med, 2:297-307. 3. America Academy of Sleep Medicine. International classification of sleep disorders, third edition. Darien: AASM, 2014.

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Screening Tools

Sleep problems can also be assessed by following questionnaires:

- Pittsburgh Sleep Quality Index (PSQI) measures sleep quality: 7-items measure sleep duration, latency, disturbance, efficiency, quality, required sleep meds and day dysfunction[1]
- Insomnia Symptoms Questionnaire (ISQ), 13-item self-report used to identify insomnia (APA DSM-IV). Diagnosis given if 3 criteria are met:[2]
  - Presence of sleep symptoms
  - Duration of least 4 weeks
  - Have significant daytime impairment, not due to other physical, mental or sleep-wake disorders
- Epworth Sleepiness Scale (ESS) measures daytime sleep impairment: 8 situations where dozing may occur, scored using a rating scale[3]

1. Buysse, D.J, Reynolds, C.F, Monk, T.H, et al (1989). The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. Psychiatry Res, 28(2): 193–213. 2. Okun, M.L, Kravitz, H.M, Sowers, M.F, et al (2009). Psychometric evaluation of the Insomnia Symptom Questionnaire: a self-report measure to identify chronic insomnia. J Clin Sleep Med, 5(1): 41–51. 3. Johns, M.W. (1991) A new method for measuring daytime sleepiness: the Epworth sleepiness scale. Sleep, 14(6): 540–545.

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Additional Assessments

- It is important to use brief questions to screen for mental health problems (e.g., anxiety, depression), physical illness (e.g., cancer) or other sleep disorders such as obstructive sleep apnoea[1]

- Assessing for depression using PHQ9 and for anxiety using GAD7
  - Question 3 on PHQ9 asks about trouble falling / staying asleep, sleeping too much

1. Siriwardena, N. (2020) Key learning points: BAP insomnia and sleep disorders. Guidelines in Practice, 23:1.

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Post-Assessment Interventions

Decision-making

a) Offer information, sleep hygiene or short-term sleep support (if trained)

b) For complex cases, refer for sleep interventions (psychologist, primary care practitioners via GP / community, online resources)

- Sleep problems should be treated on their own, rather than seen as a secondary problem to other mental and physical health problems

- Interventions should be safe and effective e.g., sleep hygiene (incl. apps such as Calm,[1] Headspace,[2] cognitive behavioural therapy (CBT), pharmacological treatment[3]

- Interventions focused on improving sleep in PLWH should focus on multiple influencing factors, including psychosocial factors[4,5]

1. Calm. Available at: https://www.calm.com. Last accessed June 2021. 2. Headspace. Available at: https://www.headspace.com. Last accessed June 2021. 3. Taibi, D, M. (2013) Sleep disturbances in Persons Living with HIV. Journal of Assoc Nurses AIDS Care, 24:72-85. 4. Gutierrez,J, Tedaldi, T.M., Armon, C., Patel, V., Hart, R., Buchacz, K. (2019) Sleep disturbances in HIV-infected patients associated with depression and high risk of obstructive sleep apnea. Sage Open Medicine, 7:1-11. 5. Fekete, E.M., Williams, S. W., Skinta, M D. (2017) Internalised HIV-stigma, loneliness, depressive symptoms and sleep quality in people living with HIV. Psychology Health, 33:398–415.

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Interventions HIV clinicians can implement in clinic to help improve quality of sleep in People Living with HIV

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