



Pharmacokinetic and clinical
observations in people over 50

Self-reported symptoms of insomnia and objective measures of sleep quality in people living with HIV and comparable controls

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on behalf of the POPPY study group

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Background

- Insomnia and sleep disturbances are commonly reported among people living with HIV (PLWH)¹
- Sleep disturbances are associated with mood disorders and decreased quality of life^{2,3}
- Whilst previous studies have generally relied on self-reported symptoms, their association with objective measures of sleep quality remains unclear

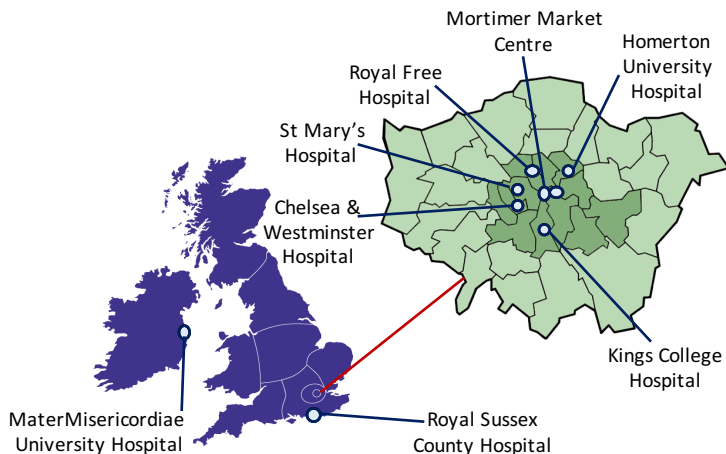
¹ Taibi DM; *JANAC* (2013)

² Kurina LM et al; *Ann Epidemiol* (2013)

³ McFarlane SI et al; *Int J Hypertens* (2015)

The POPPY-sleep study

- The **POPPY-sleep sub-study** recruited a subset of POPPY PLWH and HIV-negative individuals, irrespective of sleep symptoms



PLWH ≥ 50 years (and 18-50 years)

- white/black African ethnicity
- acquired HIV via sexual routes

HIV-negatives ≥ 50 years

frequency matched on gender, ethnicity, sexual orientation and location (in/out London)

- Overarching aim of POPPY-sleep is to characterize sleep patterns in PLWH and the effects on inflammation and brain function

see also P 63

Aims

- To compare subjective and objective measures of sleep disturbances of PLWH to those of appropriately chosen HIV-negative individuals
- To evaluate associations between self-reported symptoms of insomnia and objectively-measured sleep duration and efficiency

Self-reported symptoms of insomnia



■ The insomnia severity index (ISI) questionnaire

Please rate the current (i.e. last 2 weeks) SEVERITY of your insomnia problem(s)

	None	Mild	Moderate	Severe	Very
1. Difficulty falling asleep:	0	1	2	3	4
2. Difficulty staying asleep:	0	1	2	3	4
3. Problem waking up too early:	0	1	2	3	4
4. How SATISFIED/dissatisfied are you with your current sleep pattern?					
Very satisfied					Very dissatisfied
0	1	2	3		4
5. To what extent do you consider your sleep problem to INTERFERE with your daily functioning (e.g. daytime fatigue, ability to function at work/daily chores, concentration, memory, mood, etc).					
Not at all interfering	A little	Somewhat	Much		Very much interfering
0	1	2	3		4

6. How NOTICEABLE to others do you think your sleeping problem is in terms of impairing the quality of your life?				
Not at all noticeable	Barely	Somewhat	Much noticeable	Very much
0	1	2	3	4
7. How WORRIED/distressed are you about your current sleep problem?				
Not at all	A little	Somewhat	Much	Very much
0	1	2	3	4

Self-reported symptoms of insomnia

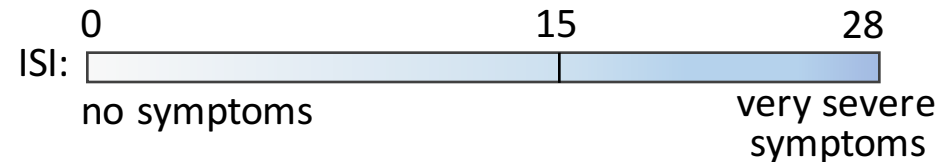
- The insomnia severity index (ISI) questionnaire

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- Self-reported clinical insomnia: ISI ≥ 15

Actigraphy data

- wGT3X-BT actigraphy device to capture and record continuous, high resolution physical activity and sleep/wake information
- Worn continuously for 7 days and nights
- **Sleep duration:** total sleep time
Sleep efficiency: sleep time / time in bed



Statistical methods

- Chi-square to compare prevalence of self-reported clinical insomnia between PLWH and HIV-negative individuals
- Wilcoxon test to compare sleep duration and efficiency between PLWH and HIV-negative individuals
- Wilcoxon test to assess differences in sleep duration/efficiency between people with/without self-reported insomnia, stratified by
 - HIV-status
 - Gender
 - Ethnicity
 - BMI (<25 vs ≥ 25 kg/m²)
 - Work shift

Participant characteristics

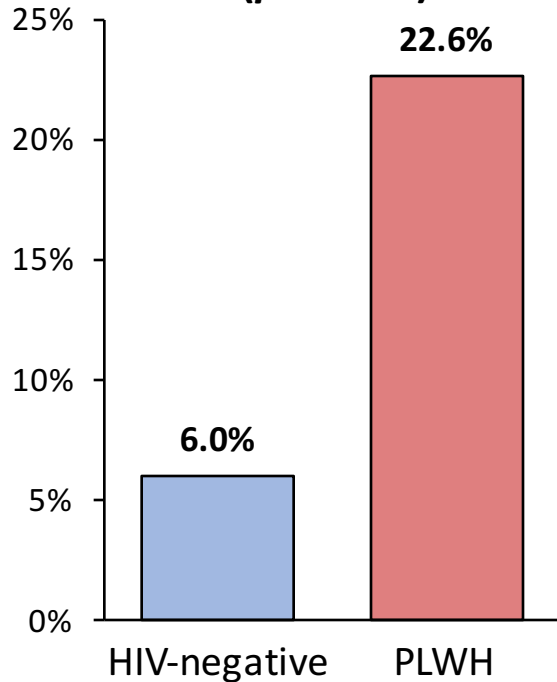
n (%) or median (IQR)	HIV- (N=117)	PLWH (N=244)
Male gender	79 (67.5%)	213 (88.0%)
White ethnicity	107 (91.5%)	221 (91.3%)
Age [years]	60 (57, 66)	60 (56, 65)
Man having sex with men (MSM)	62 (53.0%)	198 (81.8%)
BMI ≥ 25 kg/m²	73 (62.4%)	133 (55.0%)
Work shift: day shifts	59 (51.8%)	67 (27.8%)
night/irregular shifts	13 (11.4%)	38 (15.8%)
not working	42 (36.8%)	136 (56.4%)
Viral load <50 copies/mL	N/A	222 (91.7%)
CD4 count [cells/μL]	N/A	599 (470, 780)

Differences between PLWH and controls



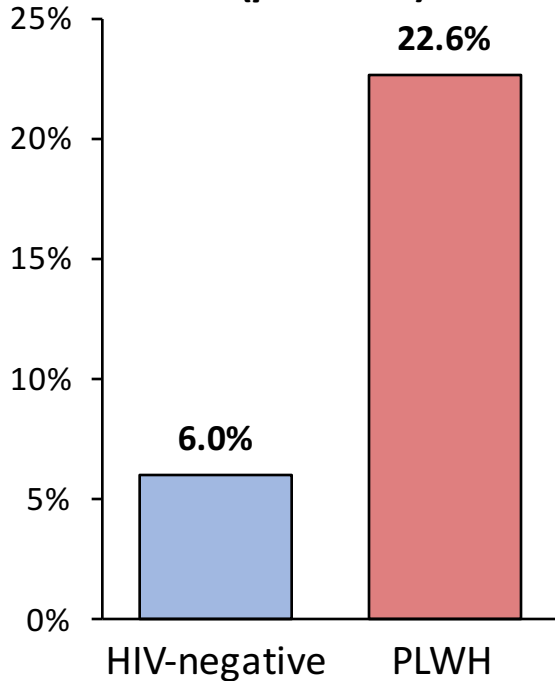
Self-reported clinical insomnia

($p < 0.001$)

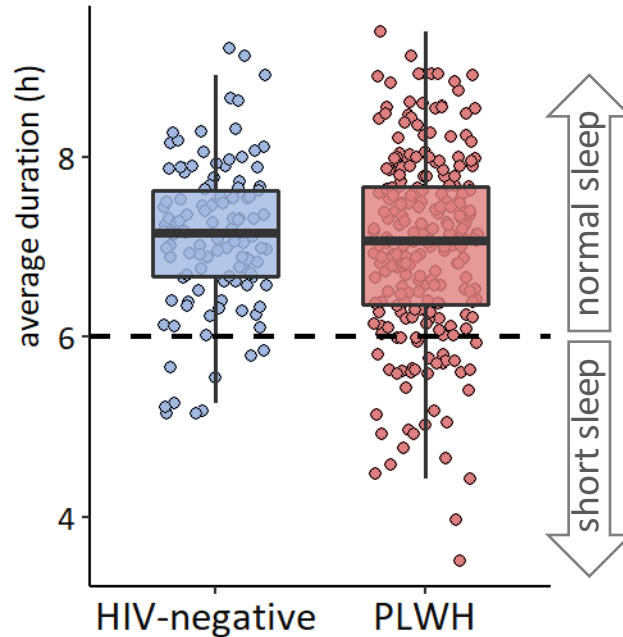


Differences between PLWH and controls

Self-reported clinical insomnia
($p < 0.001$)



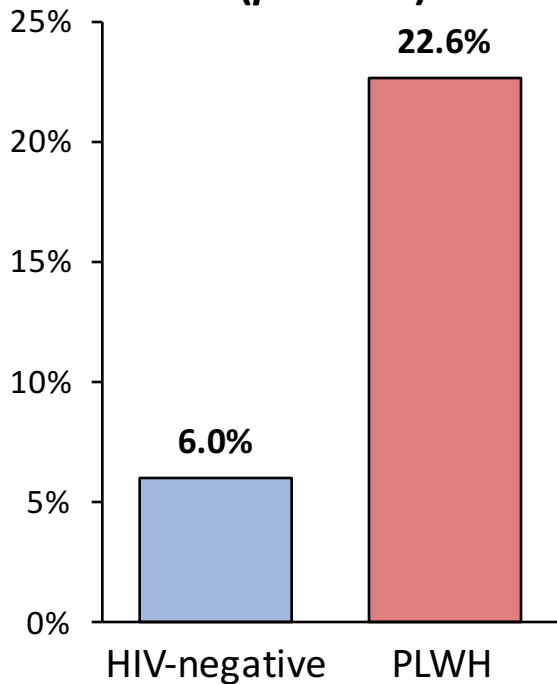
Sleep duration ($p = 0.36$)
7.1h vs. 7.0h



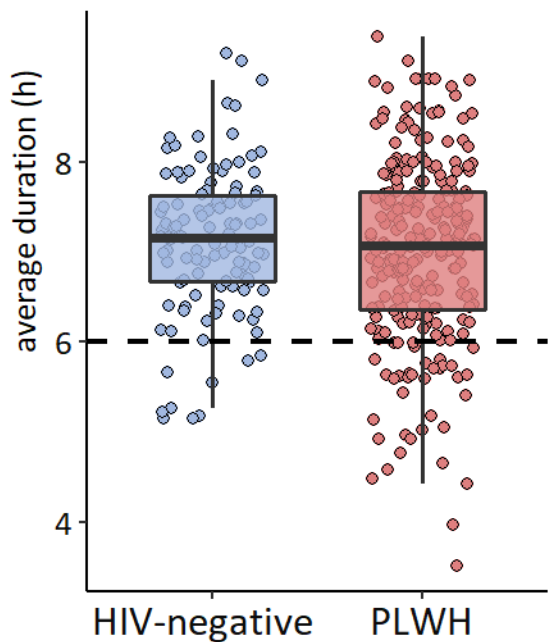
Differences between PLWH and controls



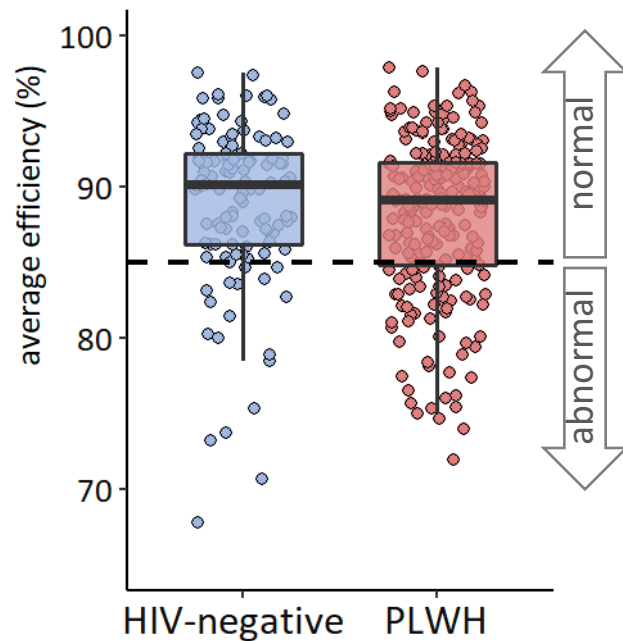
Self-reported clinical insomnia
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Sleep duration ($p = 0.36$)
7.1h vs. 7.0h



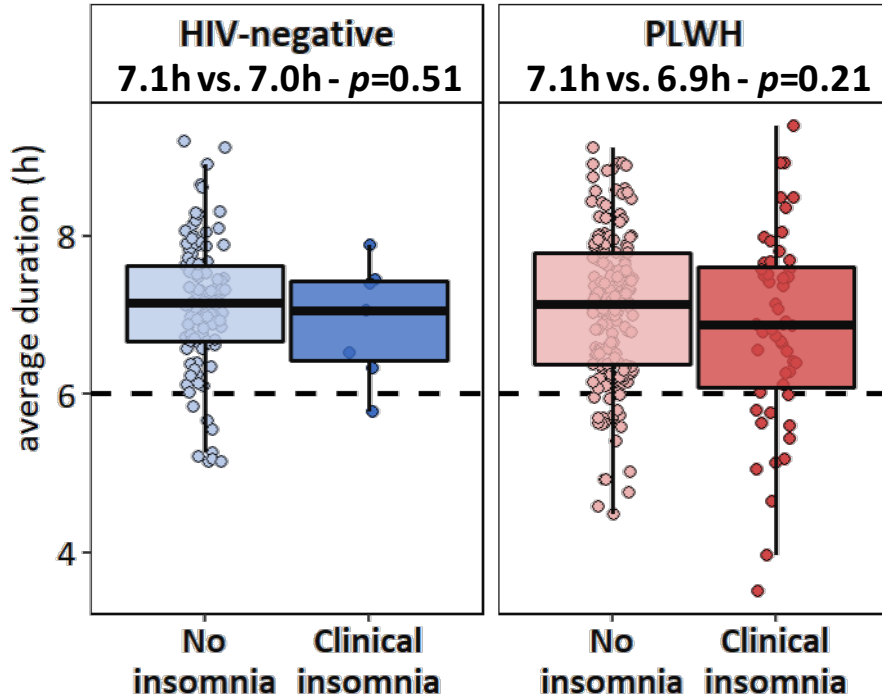
Sleep efficiency ($p = 0.08$)
90% vs. 89%



Sleep duration and efficiency vs. self-reported insomnia

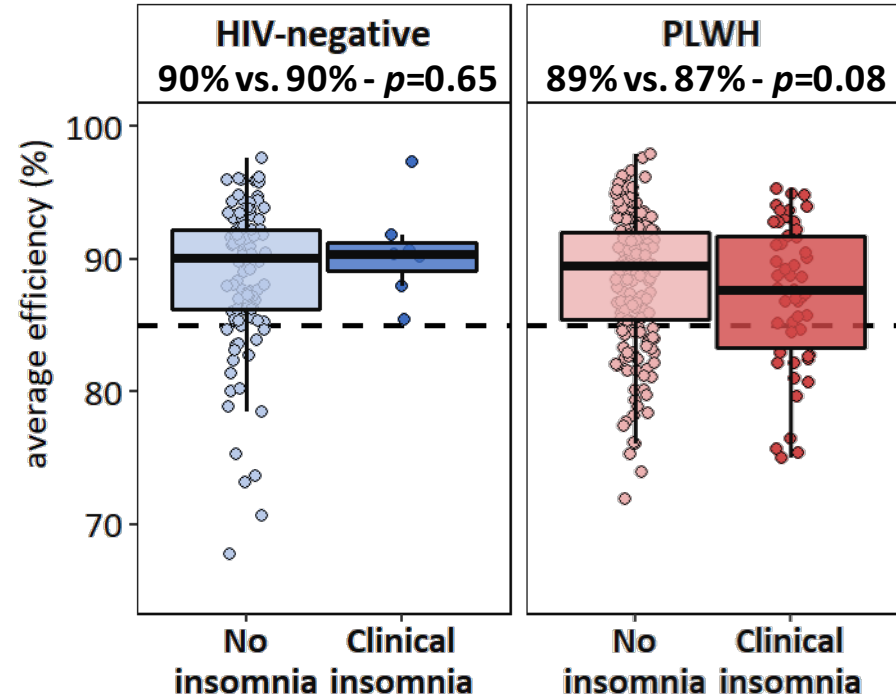


Sleep duration



Self-reported status

Sleep efficiency



Self-reported status

Sleep duration and efficiency vs. self-reported insomnia within PLWH



Sleep duration

	No clinical insomnia	Clinical insomnia	difference	<i>p</i>
Gender				0.23
Female	7.3h (6.8-7.9)	6.3h (6.0-7.5)	-60 min	
Male	7.1h (6.4-7.8)	6.9h (6.3-7.7)	-15 min	

Sleep efficiency

	No clinical insomnia	Clinical insomnia	difference	<i>p</i>
				0.89
	89% (84-90)	87% (83-90)	-2%	
	90% (86-92)	88% (83-92)	-2%	

Sleep duration and efficiency vs. self-reported insomnia within PLWH



Sleep duration

	No clinical insomnia	Clinical insomnia	difference	<i>p</i>
Gender				0.23
Female	7.3h (6.8-7.9)	6.3h (6.0-7.5)	-60 min	
Male	7.1h (6.4-7.8)	6.9h (6.3-7.7)	-15 min	
Ethnicity				0.98
Black-African	6.9h (6.0-7.3)	6.4h (5.5-7.5)	-31 min	
White	7.2h (6.4-7.8)	6.9h (6.2-7.6)	-15 min	

Sleep efficiency

	No clinical insomnia	Clinical insomnia	difference	<i>p</i>
				0.89
	89% (84-90)	87% (83-90)	-2%	
	90% (86-92)	88% (83-92)	-2%	
				0.72
	83% (78-88)	84% (81-88)	+1%	
	90% (86-92)	88% (84-82)	-2%	

Sleep duration and efficiency vs. self-reported insomnia within PLWH



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Black-African	6.9h (6.0-7.3)	6.4h (5.5-7.5)	-31 min	
White	7.2h (6.4-7.8)	6.9h (6.2-7.6)	-15 min	
BMI				0.73
<25 Kg/m ²	7.2h (6.5-7.9)	6.9h (6.3-7.6)	-18 min	
≥25 Kg/m ²	7.0h (6.3-7.7)	6.9h (5.6-7.7)	-9 min	

Sleep efficiency

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				0.89
	89% (84-90)	87% (83-90)	-2%	
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	83% (78-88)	84% (81-88)	+1%	
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				0.56
	90% (86-92)	89% (85-92)	-1%	
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Sleep duration and efficiency vs. self-reported insomnia within PLWH



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	No clinical insomnia	Clinical insomnia	difference	<i>p</i>
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≥25 Kg/m ²	7.0h (6.3-7.7)	6.9h (5.6-7.7)	-9 min	
Work shift				0.30
Day shift	7.0h (6.3-7.4)	7.5h (6.9-8.1)	+30 min	
Other shift	7.0h (6.4-7.5)	6.3h (5.8-7.5)	-40 min	
Don't work	7.3h (6.5-8.0)	6.8h (6.0-7.6)	-27 min	

Sleep efficiency

	No clinical insomnia	Clinical insomnia	difference	<i>p</i>
Gender				0.89
Female	89% (84-90)	87% (83-90)	-2%	
Male	90% (86-92)	88% (83-92)	-2%	
Ethnicity				0.72
Black-African	83% (78-88)	84% (81-88)	+1%	
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BMI				0.56
<25 Kg/m ²	90% (86-92)	89% (85-92)	-1%	
≥25 Kg/m ²	89% (84-92)	87% (83-90)	-2%	
Work shift				0.31
Day shift	89% (84-92)	89% (86-92)	0%	
Other shift	89% (85-91)	89% (87-91)	0%	
Don't work	90% (87-92)	87% (82-92)	-3%	

Summary



- Whilst self-reported clinical insomnia is more prevalent in PLWH than controls, there are no differences in sleep duration/efficiency
- The majority of PLWH (and controls) showed sleep duration and efficiency above standard thresholds of poor sleep quality
- Associations between self-reported clinical insomnia and objective measures of sleep quality appear generally weak

Discussion

- Subjective and objective measures of sleep quality may address different constructs (e.g. sleep onset latency or fragmented sleep)
- Findings highlight the importance of patient-reported symptoms for better understanding the psychological and physiological determinants of sleep disturbances in PLWH
- Further research is needed to elucidate the perception of good sleep and consequences of poor sleep in PLWH

Acknowledgments



POPPY-Sleep Leadership Team: Ken Kunisaki, Susan Redline, Alan Winston, Caroline Sabin, Paddy Mallon, Nicki Doyle, Amalia Ndoutoumou

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