Sleep disturbance in patients with psoriasis: A multi-method investigation

Alasdair L. Henry
PhD student
Division of Musculoskeletal and Dermatological Sciences
University of Manchester

alasdair.henry@postgrad.manchester.ac.uk
Conflicts of interest

• None to declare
Psoriasis: A common, complex long-term inflammatory condition going beyond the skin...

- Affects 2-3% population
- Bimodal age of onset: <40 years/>40 years
- Mediated by genetic and immune processes

Photograph provided by Professor C. Griffiths
The many facets of sleep

- Duration
- Alertness/sleepiness
- Timing
- Quality
- Continuity

Buysse, 2014 Sleep
Sleep

Metabolic health

Immunological health

Cardiovascular health

Neurocognitive functioning

Emotional functioning
Sleep Disturbance

- Hypertension
- Diabetes
- CVD
- Immune dysfunction
- Anxiety
- Depression
- Obesity
Sleep disturbance in long-term conditions

- Chronic pain
- Atopic dermatitis
  - >50%
  - Associated with disease severity
  - Daytime impairments
  - Itch proposed to interact with sleep
- Psoriasis
  - Itch, low mood, pain
  - 25% increased risk of CVD

Chang et al. 2014. Pediatrics
McBeth et al. 2015. Curr Rheumatol Rep
Henry et al. 2017 BID
Understand the extent, characteristics and correlates of sleep disturbance in psoriasis

Examine the reciprocal relationship between sleep disturbance and daytime variables

Identify possible treatment targets and interventions
1) Understand the extent, characteristics and correlates of sleep disturbance in psoriasis

Measurement, Classification and Evaluation of Sleep Disturbance in Psoriasis: A Systematic Review

Alasdair L. Henry¹,², Simon D. Kyle³, Sahil Bhandari⁴, Anna Chisholm¹,², Christopher E. M. Griffiths¹,⁵, Christine Bundy¹,²
1) Understand the extent, characteristics and correlates of sleep disturbance in psoriasis

- n=186
  - 76.3% classed as poor sleepers
    - TST = 371.3% (±89.1)
      - 93.3 < 7 h
    - SE = 75.3% (±17.3)
  - OSA risk = 32.8%
  - Itch, cognitive arousal, low mood and somatic arousal independently predicted PSQI scores
  - Systemic inflammation (Wong et al. 2017, J Rheumatol)
2) Examine the reciprocal relationship between sleep disturbance and daytime/night-time variables

- Recruitment
  - N=17 recruited from clinical and community settings
  - Semi-structured interviews
  - Guided by CS-SRM

**Cause:**

“Yeah, if I’m having a really bad flare-up and my skin’s really red and irritated, I know before I go to bed that I’m going to wake up at least once during the night, because it’s just so irritable that you can’t focus on sleep...you’re constantly thinking, my God, that’s so itchy, or, that’s so irritable, what can I do to make that not feel that way. [P12]”

**Consequences:**

“It would definitely flare up...I would be getting very little sleep and it would be over a period of days and it would be causing me stress, and on top of that I would be flaring up slowly, and that will be adding another stress...[P5]”

Henry et al. in prep
2) Examine the reciprocal relationship between sleep disturbance and daytime/night-time variables

- Experience sampling method (ESM) (Larson & Csikszentmihalyi, 1983)
  - Capture experience in real-time across multiple days/weeks
    - Increased ecological validity
    - Sequential relationships
  - Combined with Actigraphy and sleep diaries
    - Associations between daytime variables and sleep
    - Chronic pain (Tang et al., 2016)
    - Chronic fatigue (Russell et al., 2016)
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Multi-level mixed linear models estimated

Level 1 - Participant

Level 2 - Days

Level 3 – Momentary assessments
2) Examine the reciprocal relationship between sleep disturbance and daytime/night-time variables

**Screening**
- PSQI >6
- Brief Sleep Screen
- Diagnosis of psoriasis
- Medication (excl. if sleep altering)
- Demographics

**Baseline**
- SPI-S
- HADS
- PSS
- DBAS

**ESM phase**
- 5x/day
  - Psoriasis Sx
  - Mood
  - Functioning
- CSD
- Night-time arousal (SIRS)
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![Diagram showing the process of examining the reciprocal relationship between sleep disturbance and daytime/night-time variables.](image-url)
2) Examine the reciprocal relationship between sleep disturbance and daytime/night-time variables

- N=19 from community and clinical settings
- 1031/1364 (75.4%) time points completed

<table>
<thead>
<tr>
<th>Variable</th>
<th>Data Type</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Sleep Time (min)</td>
<td>Subjective</td>
<td>408.8 (81.3)</td>
</tr>
<tr>
<td></td>
<td>Actigraphy</td>
<td><strong>370.8 (71.9)</strong></td>
</tr>
<tr>
<td>Sleep Onset Latency (min)</td>
<td>Subjective</td>
<td>28.9 (31.9)</td>
</tr>
<tr>
<td></td>
<td>Actigraphy</td>
<td><strong>19.8 (40.7)</strong></td>
</tr>
<tr>
<td>Sleep Efficiency (%)</td>
<td>Subjective</td>
<td>83.8 (11.5)</td>
</tr>
<tr>
<td></td>
<td>Actigraphy</td>
<td><strong>76.7 (11.2)</strong></td>
</tr>
<tr>
<td>Sleep Quality (1 very poor-5 very good)</td>
<td>Subjective</td>
<td>2.9 (1.1)</td>
</tr>
<tr>
<td>Sleep Fragmentation Index (%)</td>
<td>Actigraphy</td>
<td><strong>32.9 (13.9)</strong></td>
</tr>
</tbody>
</table>
2) Examine the reciprocal relationship between sleep disturbance and daytime/night-time variables

<table>
<thead>
<tr>
<th>Model</th>
<th>Predictor</th>
<th>Outcome</th>
<th>β</th>
<th>P</th>
<th>95% CI</th>
<th>Model ICC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psoriasis symptoms</td>
<td>Subjective TST</td>
<td>0.671</td>
<td>0.456</td>
<td></td>
<td>-1.095, 2.437</td>
<td>0.148</td>
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<tr>
<td>SIRS</td>
<td></td>
<td>-1.691</td>
<td>0.000</td>
<td></td>
<td>-2.637, -0.744</td>
<td></td>
</tr>
<tr>
<td>Mood</td>
<td></td>
<td>1.336</td>
<td>0.463</td>
<td></td>
<td>-2.229, 4.903</td>
<td></td>
</tr>
<tr>
<td>Psoriasis symptoms</td>
<td>Subjective SE</td>
<td>-0.129</td>
<td>0.261</td>
<td></td>
<td>-0.353, 0.096</td>
<td>0.087</td>
</tr>
<tr>
<td>SIRS</td>
<td></td>
<td>-0.383</td>
<td>0.000</td>
<td></td>
<td>-0.509, -0.256</td>
<td></td>
</tr>
<tr>
<td>Mood</td>
<td></td>
<td>0.091</td>
<td>0.701</td>
<td></td>
<td>-0.375, 0.557</td>
<td></td>
</tr>
<tr>
<td>Psoriasis symptoms</td>
<td>Sleep Quality</td>
<td>-0.010</td>
<td>0.343</td>
<td></td>
<td>-0.031, 0.011</td>
<td>0.185</td>
</tr>
<tr>
<td>SIRS</td>
<td></td>
<td>-0.040</td>
<td>0.000</td>
<td></td>
<td>-0.051, -0.029</td>
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</tr>
<tr>
<td>Mood</td>
<td></td>
<td>0.037</td>
<td>0.089</td>
<td></td>
<td>-0.006, 0.080</td>
<td></td>
</tr>
</tbody>
</table>

(1) Examine whether daytime experiences (Ps symptoms, mood and night-time arousal) and objective/subjective sleep

(1) No sig. relationship b/t symptoms and sleep (all p>0.05)
(2) Night-time arousal sig predicted subjective sleep parameters
2) Examine the reciprocal relationship between sleep disturbance and daytime/night-time variables

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Outcome</th>
<th>β</th>
<th>P</th>
<th>95% CI</th>
<th>Model ICC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actigraphy</td>
<td>TST</td>
<td>Fatigue</td>
<td>-0.151</td>
<td>0.028</td>
<td>-0.286, -0.016</td>
</tr>
<tr>
<td>Sleep diary</td>
<td>TST</td>
<td>Sleepiness</td>
<td>-0.152</td>
<td>0.005</td>
<td>-0.257, -0.464</td>
</tr>
<tr>
<td></td>
<td>Fatigue</td>
<td>-0.113</td>
<td>0.040</td>
<td>-0.222, -0.052</td>
<td>0.355</td>
</tr>
<tr>
<td></td>
<td>SE</td>
<td>Sleepiness</td>
<td>-0.128</td>
<td>0.044</td>
<td>-0.252, -0.004</td>
</tr>
<tr>
<td>Sleep Quality</td>
<td>Sleepiness</td>
<td>-0.149</td>
<td>0.046</td>
<td>-0.295, -0.003</td>
<td>0.363</td>
</tr>
<tr>
<td></td>
<td>Fatigue</td>
<td>-0.161</td>
<td>0.034</td>
<td>-0.309, -0.012</td>
<td>0.328</td>
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<tr>
<td></td>
<td>Concentration</td>
<td>0.141</td>
<td>0.032</td>
<td>0.012, 0.269</td>
<td>0.444</td>
</tr>
</tbody>
</table>

(2) Explore whether sleep (obj/subj) predicts next day psoriasis symptoms and functioning
(1) No sleep parameters sig. predicted next day symptoms (all p>0.05)
(2) Subj and obj sleep variables sig predicted poorer next-day functioning including fatigue, sleepiness and concentration
3) Identify possible treatment targets and interventions

- Associated factors:
  - Physical
    - Itch/psoriasis symptoms - mixed
      - Mild psoriasis severity/well-controlled participants
      - Similar findings in chronic pain (Tang et al., 2012)
  - Psychological factors
    - Cognitive arousal
    - Dysfunctional beliefs & attitudes above cut-off for clinically significant insomnia

- CBT for insomnia (CBT-I)/variant
  - Moderate to strong effects in primary and comorbid insomnia (Hedges g = 0.67-0.88) and similar effects on sleep in physical and psychological illness
  - Small-moderate effects on physical outcomes (g = 0.39)

- Transdiagnostic benefits in mental health

Wu et al. 2015. JAMA Intern Med
Freeman et al. 2017. Lancet Psychiatry
Summary

- Sleep disturbance common
  - Present across multiple domains of sleep
  - Reciprocally interacts with daily life in psoriasis
- Similarities with insomnia literature
  - Characteristics
  - Precipitating factors
  - Consequences
  - Sleep-related beliefs
- Current sleep treatments may be effective
Future work...

- Pilot study of CBT-I in psoriasis
- Examine interaction of sleep disturbance and biological processes
  - Inflammatory activity/disease exacerbation
  - Mechanisms
    - Dysregulation of HPA axis -> upregulated pro-inflammatory and immunosuppressant activity
      - Delayed healing
    - Immune dysregulation
    - Altered melatonin
- Alterations in sleep architecture - PSG

Irwin, 2015. Ann Rev
Glaser & Kiecolt-Glaser, 2005,.Nat Rev Immunol
Acknowledgements

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  – Professor Christine Bundy (Cardiff)
  – Dr Simon Kyle (Oxford)
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  – Professor Christopher Griffiths (Manchester)
  – Dr Lesley-Anne Carter (Manchester)

• **Psoriasis Association**

• **People with psoriasis who participated**