

**Supplementary 3:** Evidence quality based on the Newcastle-Ottawa Scale (NOS) adapted for cross-sectional studies.

Study	Monitoring Method	Selection					Comparability			Outcome			Overall Total	Quality Category		
		Sample size represents target population	Sample size adequate or justified	Response rate reported	Expertise described or justified	Subtotal	Control for athlete expertise	Control for other factors (i.e., sex)	Subtotal	Outcome assessment	Statistical test	Subtotal	Total /10	High (>7)	Moderate (5-7)	Low (<5)
Caia et al. 2017	Actigraphy <sup>a</sup>	0	0	1	1	2	1	1	2	2	1	3	7	-	1	-
Caia et al. 2017	Actigraphy <sup>c,d</sup>	0	1	1	1	3	1	1	2	2	1	3	8	1	-	-
Caia et al. 2017	Actigraphy <sup>a</sup>	0	1	0	1	2	1	1	2	2	1	3	7	-	1	-
Chennaoui et al. 2016	Actigraphy <sup>c</sup>	0	0	0	1	1	1	0	1	2	1	3	5	-	1	-
Dennis et al. 2016	Actigraphy <sup>d</sup>	0	1	1	1	3	1	1	2	2	1	3	8	1	-	-
Dobrosielski et al. 2016	PPG <sup>k</sup>	0	1	1	1	3	1	1	2	2	1	3	8	1	-	-
Dunican et al. 2017	Actigraphy <sup>d</sup>	0	1	0	1	2	1	0	1	2	1	3	6	-	1	-
Dunican et al. 2018	Actigraphy <sup>d</sup>	0	1	1	1	3	1	1	2	2	1	3	8	1	-	-
Eagles & Lovell. 2016	Actigraphy <sup>e</sup>	0	0	1	1	2	1	1	2	2	1	3	7	-	1	-
Fietze et al. 2009	Actigraphy <sup>c</sup>	0	1	1	1	3	1	0	1	2	1	3	7	-	1	-
Fowler et al. 2014	Actigraphy <sup>d</sup>	0	0	0	1	1	1	1	2	2	1	3	6	-	1	-
Fowler et al. 2015	Actigraphy <sup>b</sup>	0	1	0	1	2	1	1	2	2	1	3	7	-	1	-
Fowler et al. 2017	Actigraphy <sup>g</sup>	0	1	0	1	2	1	1	2	2	1	3	7	-	1	-
Fullagar et al. 2016	Actigraphy <sup>d</sup>	0	0	1	1	2	1	1	2	2	1	3	7	-	1	-
Fuller et al. 2017	PSG	1	1	1	1	4	1	1	2	2	1	3	9	1	-	-
George et al. 2003	PSG	0	1	1	1	3	1	1	2	2	1	3	8	1	-	-
Hoshikawa et al. 2013	Actigraphy <sup>h</sup>	0	0	0	1	1	1	1	2	2	1	3	6	-	1	-
Juliff et al. 2018	Actigraphy <sup>b</sup>	0	1	1	1	3	1	1	2	2	1	3	8	1	-	-
Juliff et al. 2018	Actigraphy <sup>b</sup>	0	0	0	1	1	1	1	2	2	1	3	6	-	1	-
Knufinke et al. 2017	Actigraphy <sup>a</sup>	1	1	0	1	3	1	1	2	2	1	3	8	1	-	-
Kolling et al. 2016	Actigraphy <sup>e</sup>	0	0	0	1	2	1	0	1	2	1	3	6	-	1	-
Kolling et al. 2017	Actigraphy <sup>e</sup>	0	1	1	1	3	1	0	1	2	1	3	7	-	1	-
Lalor et al. 2018	Actigraphy <sup>b</sup>	0	1	0	1	2	1	1	2	2	0	2	6	-	1	-
Lastella et al. 2014	Actigraphy <sup>c</sup>	0	1	0	1	2	1	1	2	2	1	3	7	-	1	-
Lastella et al. 2015	Actigraphy <sup>b</sup>	0	1	0	1	2	1	1	2	2	1	3	7	-	1	-
Lastella et al. 2015	Actigraphy <sup>b</sup>	0	1	0	1	2	1	1	2	2	1	3	7	-	1	-
Lastella et al. 2015	Actigraphy <sup>b</sup>	1	1	1	1	4	1	1	2	2	1	3	9	1	-	-
Lastella et al. 2017	Actigraphy <sup>b</sup>	0	1	0	1	2	1	1	2	2	1	3	7	-	1	-
Leeder et al. 2012	Actigraphy <sup>c</sup>	1	1	0	1	3	1	1	2	2	1	3	8	1	-	-
Miller et al. 2017	Actigraphy <sup>b</sup>	1	1	0	1	3	1	1	2	2	1	3	8	1	-	-
Nedelec et al. 2017	Actigraphy <sup>b</sup>	0	0	0	1	1	1	1	2	2	0	2	5	-	1	-
Netzer et al. 2001	PSG	0	0	1	1	2	1	1	2	2	1	3	7	-	1	-
O'Donnell & Driller 2017	Actigraphy <sup>d</sup>	0	1	0	1	2	1	1	2	2	1	3	7	-	1	-
O'Donnell et al. 2018	Actigraphy <sup>d</sup>	0	0	0	1	1	1	1	2	2	1	3	6	-	1	-
O'Donnell et al. 2018	Actigraphy <sup>d</sup>	0	0	0	1	1	1	1	2	2	1	3	6	-	1	-
Pitchford et al. 2017	Actigraphy <sup>c</sup>	0	1	1	1	3	1	1	2	2	1	3	8	1	-	-
Richmond et al. 2004	Actigraphy <sup>c</sup>	0	0	0	1	1	1	1	2	2	1	3	6	-	1	-
Richmond et al. 2007	Actigraphy <sup>c</sup>	0	1	0	1	2	1	1	2	2	1	3	7	-	1	-
Robey et al. 2014	Actigraphy <sup>b</sup>	0	0	1	1	2	1	1	2	2	1	3	7	-	1	-
Romyn et al. 2016	Actigraphy <sup>c</sup>	0	0	0	1	1	1	1	2	2	1	3	6	-	1	-
Sargent et al. 2013	PSG	0	0	0	1	1	1	1	2	2	1	3	6	-	1	-
Sargent et al. 2014	Actigraphy <sup>b</sup>	1	1	1	1	4	1	1	2	2	1	3	9	1	-	-
Sargent et al. 2014	Actigraphy <sup>b</sup>	0	0	0	1	1	1	0	1	2	1	3	5	-	1	-
Sargent & Roach 2016	Actigraphy <sup>b</sup>	0	1	0	1	2	1	1	2	2	1	3	7	-	1	-
Schaal et al. 2015	Actigraphy <sup>c</sup>	0	0	0	1	1	1	1	2	2	1	3	6	-	1	-
Shearer et al. 2015	Actigraphy <sup>c</sup>	0	1	0	1	2	1	1	2	2	1	3	7	-	1	-
Staunton et al. 2017	Actigraphy <sup>f</sup>	0	1	0	1	2	1	1	2	2	1	3	7	-	1	-
Thornton et al. 2017	Actigraphy <sup>c</sup>	0	1	1	1	3	1	1	2	2	0	2	7	-	1	-
Thornton et al. 2017	Actigraphy <sup>c</sup>	0	0	1	1	2	1	1	2	0 <sup>i</sup>	0	0	4	-	-	1
Tuomilehto et al. 2016	PSG	0	1	1	1	3	1	1	2	2	1	3	8	1	-	-
Van Ryswyk et al. 2017	Actigraphy <sup>b</sup>	0	1	1	1	3	1	1	2	2	1	3	8	1	-	-
Taylor et al. 1997	PSG	0	0	0	1	1	1	1	2	2	1	3	6	-	1	-
Roach et al. 2013	Actigraphy <sup>a</sup>	0	1	0	1	2	1	1	2	2	0	2	6	-	1	-
Whitworth-Turner et al. 2017	EEG <sup>j</sup>	0	0	1	1	2	1	1	2	2	1	3	7	-	1	-
<b>Total</b>		<b>5/54</b>	<b>33/54</b>	<b>22/54</b>	<b>54/54</b>		<b>54/54</b>	<b>48/54</b>		<b>53/54</b>	<b>49/54</b>		<b>7 (1)</b>	<b>15</b>	<b>38</b>	<b>1</b>
<b>Mean (SD)</b>																

The NOS for cohort studies was adapted for use with cross sectional studies in a similar manner to previous research<sup>22</sup>. According to the aims of the review, criteria for each subscale item were identified<sup>22</sup>. A score of '0' was awarded when criteria was not satisfied, a score of '1' was awarded when criteria was satisfied, and in some cases a score of '2' was awarded when criteria was satisfied using a validated method or an established model. The sum of scores for all subscale items were used to categorise overall study quality as either high (>7), moderate (5-7), or low (<5). The criteria for each subscale item is described below:

- *Sample size represents target population (i.e., elite athletes from all sports):* 1 = study recruited athletes from more than one sport, 0 = study recruited athletes from one sport only.
- *Sample size adequate or justified:* 1 = study recruited >15 participants or justified sample size, 0 = study recruited ≤15 participants and did not justify sample size.
- *Response rate reported:* 1 = study reported response rate (i.e., number of nights data was intended to be recorded in study design, or number of participants that fulfilled study requirements), 0 = study did not report response rate.
- *Expertise described or justified:* 2 = study used an established model to justify expertise, 1 = study reasonably inferred athletes were elite. Note, minimum 'semi-elite' status according to the Model for Classifying the Validity of Expert Samples in Sport Psychology was required for inclusion<sup>8,21</sup>.
- *Control for athlete expertise:* 1 = study results included data from elite athletes only, 0 = study results included data from athletes not deemed 'semi-elite' or higher.
- *Control for other factors:* 1 = where the study recruited both males and females, results were reported for each gender, 0 = where the study recruited both males and females, only combined results were reported.
- *Outcome assessment:* 2 = sleep was monitored using a validated objective tool, 1 = sleep was monitored using a validated subjective tool, 0 = sleep was monitored with a tool that has not been validated. Note; inclusion criteria required sleep to be monitored with an objective tool.
- *Statistical test:* 1 = statistical test to analyse data is described, appropriate, and measurement of association is presented (e.g., p-value), 0 = statistical test to analyse data is not described, not appropriate, or the measurement of association not presented. Note; studies that interpreted data using magnitude-based inferences scored 0 due to concerns over risk of type 1 error.

The sleep monitoring method used in each study is also shown in the table. For studies that used actigraphy, <sup>a</sup> indicates a 'high' (>80 activity counts) sleep-wake threshold was used, <sup>b</sup> indicates a 'medium' (>40 activity counts) sleep-wake threshold was used, and <sup>c</sup> indicates sleep-wake threshold was not reported. In addition, some studies used specific algorithms to determine sleep wake thresholds, including <sup>d</sup> the 'Fatigue Science' algorithm specific to 'Readiband', <sup>e</sup> the 'SenseWear' software algorithm, <sup>f</sup> the Cole-Kripke algorithm, and <sup>g</sup> the Sadeh algorithm. <sup>h</sup> Indicates a modified version of Cole's algorithm was used with a sheet sensor to determine sleep-wake thresholds. <sup>i</sup> Indicates device had not been validated against PSG at time of publication but had been strongly correlated with a device that had been validated (e.g., SenseWear). <sup>j</sup> Indicates sleep was monitored using electroencephalography (EEG) recorded with a headband device validated against PSG. <sup>k</sup> indicates photoplethysmography (PPG) Morpheus Ox device monitored sleep.