# Supplementary data to:

# Actigraphically measured slowing in depression: Systematic review and meta-analysis

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## Modified Newcastle-Ottawa Scale

Note: Our version of the scale was modified to produce a comprehensive score, ranging from 0 (lowest quality) to 13 (highest quality), to be assigned to each included study.

**Selection of Participants and ascertainment of diagnosis**

1) Representativeness of the depressed or bipolar patients

**2 =** a) representative, drawn from a broader population

**1 =** c) selected group of patients, attribute as important as diagnosis

**0 =** d) no description;

2) Selection of the controls

**2 =** a) drawn from the general community

**1 =** b) drawn from a different specific source, e.g. hospital staff

**0 =** c) no description;

3) Ascertainment of depressed or bipolar disorder

 **2 =** a) (semi)structured interview (e.g. MINI, SCID, CIDI)

**1 =** b) records

**1 =** c) self-report

 **0 =** d) no description

**Comparability** **of Groups on the Basis of the Design**

4) Groups are similar in age

**1 =** a) less than 20% difference

 **0 =** b) more than 20% difference

5) Groups are similar in sex distribution

 **1 =** a) less than 20% difference

**0 =** b) more than 20% difference

6) Group sizes are similar

 **1** **=** a) less than 20% difference

 **0** **=** b) more than 20% difference

**Quality of the Actigraphy Measurement**

7) Ascertainment of outcome, placement of accelerometer

 **2 =** a) Accelerometer worn on nondominant wrist or as belt

 **1** **=** b) laterality not specified or dominant wrist/arm

 **0 =** c) no description;

8) Duration of actigraphy measurement

 **2 =** a) longer than 7d

 **1** **=** b) 24 hr – 7d

 **0 =** c) shorter than 24 hr

Table S1: Detailed rating of risk of bias for each included study

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Study | Selection of patients | Selection of controls | Diagnosis ascertainment | Age comparable | Sex distribution comparable | N of groups similar | Actigraph positioning | Actigraphy duration |
| Akinci 2021 | 1 | 0 | 2 | 1 | 1 | 1 | 2 | 1 |
| Armitage 2004 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 1 |
| Aronen 2011 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 1 |
| Avila 2013 | 2 | 0 | 2 | 1 | 1 | 0 | 1 | 1 |
| Benard 2019 | 1 | 1 | 2 | 1 | 1 | 0 | 2 | 2 |
| Bradley 2017 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 2 |
| Cantisani 2016 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 1 |
| Difrancesco 2019 | 2 | 2 | 2 | 1 | 1 | 0 | 2 | 2 |
| Esaki 2019 | 2 | 2 | 2 | 1 | 0 | 1 | 2 | 1 |
| Faedda 2016 | 2 | 2 | 2 | 1 | 1 | 0 | 2 | 1 |
| George 2021 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 2 |
| Glod 1997 | 2 | 2 | 2 | 1 | 0 | 1 | 2 | 1 |
| Harvey 2005 | 2 | 1 | 2 | 1 | 0 | 0 | 2 | 2 |
| Hauge 2011 | 1 | 1 | 2 | 1 | 0 | 0 | 1 | 2 |
| Hori 2016 | 1 | 2 | 2 | 1 | 1 | 1 | 2 | 1 |
| Janney 2014 | 1 | 2 | 2 | 1 | 0 | 1 | 2 | 1 |
| Jones 2005 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 1 |
| Koo 2019 | 1 | 0 | 2 | 1 | 1 | 1 | 2 | 1 |
| Krane-Gartiser 2014/15 | 2 | 1 | 1 | 1 | 0 | 1 | 1 | 1 |
| Loving 2005 | 1 | 2 | 2 | 1 | 0 | 0 | 1 | 1 |
| McGlashan 2019 | 1 | 1 | 2 | 1 | 1 | 0 | 1 | 2 |
| McGlinchey 2014 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 |
| McNamara 2021 | 1 | 1 | 2 | 1 | 1 | 0 | 2 | 1 |
| O'Brien 2017 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 |
| Pye 2021 | 1 | 1 | 2 | 1 | 0 | 0 | 2 | 2 |
| Reichert 2015 | 2 | 2 | 1 | 1 | 1 | 0 | 2 | 1 |
| Salvatore 2008 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 1 |
| Sander 2018 | 1 | 1 | 2 | 0 | 1 | 0 | 1 | 1 |
| Schneider 2020 | 2 | 2 | 2 | 1 | 1 | 0 | 1 | 2 |
| Slyepchenko 2019 | 2 | 2 | 2 | 0 | 0 | 0 | 1 | 2 |
| St.Amand 2013 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 2 |
| Teicher 1997 | 2 | 2 | 2 | 1 | 0 | 0 | 1 | 1 |
| Verkooijen 2017 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 2 |
| Volkers 2003 | 2 | 0 | 2 | 1 | 0 | 1 | 2 | 1 |

Table S2: Results of (sub)analyses

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Comparison | Number of studies | SMD (95%-CI) | p-value | Q-value | df(Q) | p(Q)-value | I2 | τ2 |
| All patients vs. controls | 33 | -.78 (-.99, -.57) | <.001 | 165 | 32 | <.001 | 84.1 | .30 |
| * Without studies reporting median
 | 31 | -.78 (-1.0, -.57) | <.001 | 149 | 30 | <.001 | 83.2 | .30 |
| * Studies with recording duration >= 7 days
 | 20 | -.82 (-1.14, -.50) | <.001 | 117 | 19 | <.001 | 89.6 | .45 |
| Youth patients vs. controls | 4 | -.33 (-.78, .12) | .15 | 8.2 | 3 | .04 | 66.9 | .13 |
| Adult patients vs. controls | 26 | -.88 (-1.13, -.62) | <.001 | 144 | 25 | <.001 | 85.9 | .35 |
| * Without studies reporting median
 | 24 | -.89 (-1.15, -.62) | <.001 | 126 | 23 | <.001 | 84.9 | .35 |
| * Studies with recording duration >= 7 days
 | 17 | -.87 (-1.26, -.49) | <.001 | 114 | 16 | <.001 | 91.3 | .57 |
| Elderly patients vs. controls & Duration >= 7 days | 3 | -.57 (-.87, -.27) | <.001 | 3.21 | 2 | .20 | 30.8 | .02 |
|  |  |  |  |  |  |  |  |  |
| MDD patients vs. controls | 23 | -.74 (-.99, -.49) | <.001 | 105 | 22 | <.001 | 83.0 | .30 |
| * Without study reporting median
 | 21 | -.74 (-1.01, -.47) | <.001 | 89.9 | 20 | <.001 | 81.4 | .30 |
| * Studies with recording duration >= 7 days
 | 11 | -.74 (-1.23, -.25) | .003 | 60.2 | 10 | <.001 | 91.7 | .60 |
| Depressed MDD patients vs. controls | 21 | -.82 (-1.07, -.56) | <.001 | 83.9 | 20 | <.001 | 80.0 | .27 |
| * Without studies reporting median
 | 19 | -.81 (-1.09, -.54) | <.001 | 77.5 | 18 | <.001 | 79.9 | .29 |
| * Studies with recording duration >= 7 days
 | 9 | -.93 (-1.48, -.37) | .001 | 45.9 | 8 | <.001 | 90.7 | .62 |
| * Youth MDD patients vs. controls
 | 4 | -.38 (-.80, .08) | .08 | 6.29 | 3 | .10 | 54.0 | .10 |
| * Adult MDD patients vs. controls
 | 14 | -1.0 (-1.35, -.66) | <.001 | 63.9 | 13 | <.001 | 83.6 | .35 |
| * + Without studies reporting median
 | 12 | -1.03 (-1.43, -.63) | <.001 | 55.8 | 11 | <.001 | 83.9 | .40 |
| * + Duration >= 7 days
 | 6 | -1.15 (-2.01, -.28) | .009 | 42 | 5 | <.001 | 93.8 | 1.06 |
| * Elderly MDD patients vs. controls & Duration >= 7 days
 | 3 | -.57 (-.92, -.21) | .002 | 3.42 | 2 | .18 | 40 | .04 |
| Remitted MDD patients vs. controls & Duration >= 7 days | 3 | -.28 (-.56, .00) | .05 | 3.83 | 2 | .15 | 48.4 | .03 |
| * Without study reporting median
 | 2 | -.45 (-.74, -.16) | .002 | .10 | 1 | .76 | 0.0 | 0.0 |
| * Adult patients only
 | 2 | -.18 (-.48, .12) | .25 | 1.54 | 1 | .22 | 35.1 | .02 |
| Depressed MDD patients vs. remitted & Duration >= 7 days | 3 | -.08 (-.50, .34) | .72 | 8.58 | 2 | .01 | 73.9 | .10 |
| * Without study reporting median
 | 2 | .15 (-.15, .46) | .33 | .20 | 1 | .65 | 0.0 | 0.0 |
| * Adult patients only
 | 2 | -.13 (-.77, .51) | .69 | 6.83 | 1 | .01 | 85.4 | .18 |
| Patients with SAD subtype vs. controls | 2 | -.63 (-1.12, -.14) | .01 | .57 | 1 | .45 | 0.0 | 0.0 |
| Mixed (remitted and depressed) vs. controls & Duration >= 7 days | 2 | -.08 (-.46, .30) | .68 | .01 | 1 | .91 | 0.0 | 0.0 |
|  |  |  |  |  |  |  |  |  |
| BD patients vs. controls | 15 | -.72 (-1.03, -.40) | <.001 | 75.1 | 14 | <.001 | 84.8 | .30 |
| * Studies with recording duration >= 7 days
 | 10 | -.82 (-1.26, -.38) | <.001 | 61.7 | 9 | <.001 | 88.2 | .43 |
| Mixed (euthymic and depressed) vs. controls | 3 | -.20 (-.75, .35) | .47 | 9.13 | 2 | .01 | 77.6 | .18 |
| * Studies with recording duration >= 7 days
 | 2 | -.34 (-1.16, .47) | .41 | 6.1 | 1 | .01 | 83.6 | .29 |
| Euthymic BD patients vs. controls | 9 | -.92 (-1.36, -.47) | <.001 | 54 | 8 | <.001 | 86.8 | .38 |
| * Studies with recording duration >= 7 days
 | 8 | -.95 (-1.46, -.44) | <.001 | 54 | 7 | <.001 | 88.5 | .45 |
| Depressed BD patients vs. controls | 2 | -.94 (-1.41, -.46) | <.001 | .09 | 1 | .77 | 0.0 | 0.0 |
|  |  |  |  |  |  |  |  |  |
| BD patients vs. MDD patients | 4 | .15 (-.13, .43) | .29 | .55 | 3 | .91 | 0.0 | 0.0 |
| * Mixed mood
 | 2 | .17 (-.19, .53) | .37 | .04 | 1 | .85 | 0.0 | 0.0 |
| * Depressed mood
 | 2 | .13 (-.31, .57) | .57 | .49 | 1 | .48 | 0.0 | 0.0 |

Table S3: Moderators

|  |  |  |
| --- | --- | --- |
| All studies | MDD | BD |
| Moderator | QM | df | p | Moderator | QM | df | p | Moderator | QM | df | p |
| Age group | .46 | 1 | .50 | Age group | .28 | 1 | .60 | Age group | 2.08 | 1 | .15 |
| Sex | .25 | 2 | .88 | Sex | .21 | 2 | .90 | Sex | 5.48 | 2 | .06 |
| Diagnosis | 1.17 | 3 | .76 | Diagnosis | NA | NA | NA | Diagnosis | NA | NA | NA |
| Patient setting | 1.98 | 2 | .37 | Patient setting | 3.60 | 2 | .17 | Patient setting | .25 | 2 | .88 |
| Actigraph placement | .13 | 2 | .94 | Actigraph placement | .51 | 2 | .77 | Actigraph placement | .23 | 2 | .89 |
| Recording duration | .19 | 1 | .67 | Recording duration | 1.70 | 1 | .19 | Recording duration | 1.07 | 1 | .30 |