Table H-5. Findings on pharmacologic versus nonpharmacologic interventions for ADHD

| **Study**  **(Companion)**  **N**  **Qualitya**  **Design**  **Age Categoryb** | **Type of ADHD**  **Diagnosis Criteria**  **Age range in years**  **% Male** | **Intervention** | **Comparison** | **Follow-up Times** | **Findings–Intervention** | **Findings–Comparison** |
| --- | --- | --- | --- | --- | --- | --- |
| **Academic performance** | | | | | | |
| Molina, 200924  (Vitiello, 201225)  579  Fair  RCT  b | Combined Type  DSM-IV  7.0-9.9 years 80% Male | Medication management | Behavioral training (parent group, parent individual, classroom (student), and teacher sessions)  Combination: Medication management and Behavioral training  Usual care | 8 years | WIAT reading  Mean = 96.1 (SD = 14.2)  p=.8541  WIAT math = 91.5 (SD = 14.8)  p=.5156  GPA = 2.79 (SD = .57)  p=.3354 | WIAT reading  Mean = 96.2 (SD = 13.2)  WIAT math = 96 (SD = 17)  GPA = 2.83 (SD = .56)  WIAT reading  Mean = 94.7 (SD = 14.5)  WIAT math = 94.7 (SD = 17.4)  GPA = 2.7 (SD = 0.56)  WIAT reading  Mean = 95.6 (SD = 13.4)  WIAT math = 95.7 (SD = 15.9)  GPA = 2.71 (SD = 0.59) |
| **Aggression** | | | | | | |
| Molina, 200924  (Vitiello, 201225)  579  Fair  RCT  b | Combined Type  DSM-IV  7.0-9.9 years 80% Male | Medication management | Behavioral training (parent group, parent individual, classroom (student), and teacher sessions)  Combination: Medication management and Behavioral training  Usual care | 8 years | Aggression conduct parent measure rated 1 (never) to 4 (often)  Mean = 1.17 (SD = .22 )  p=.4511 | Aggression conduct parent measure rated 1 (never) to 4 (often)  Mean = 1.13 (SD = .17)  Aggression conduct parent measure rated 1 (never) to 4 (often)  Mean = 1.15 (SD = .24)  Aggression conduct parent measure rated 1 (never) to 4 (often)  Mean = 1.15 (SD = .23) |
| **Behavior changes** | | | | | | |
| Gelade, 201626  112  Good  RCT  b | Combined Type  DSM-IV-TR  9.63 years (SD1.76)  76% Male | Neurofeedback  training | MPH | 12 weeks | SWAN-Inattention (parent)  Mean = -0.32 (95% CI: -0.53, -0.10)  SWAN-Hyperactivity/Impulsiveness (parent)  Mean = -0.29 (95% CI: -0.50, -0.07)  SWAN-Inattention (teacher)  Mean = -0.10 (95% CI: -0.31, -0.11)  SWAN-Hyperactivity/Impulsiveness (teacher)  Mean = -0.03 (95% CI: -0.28, 0.23) | SWAN-Inattention (parent)  Mean = -0.78 (95%CI: -1.03 to ‑0.53)  SWAN-Hyperactivity/Impulsiveness (parent)  Mean = -0.52 (95% CI: -0.74 to ‑0.30)  SWAN-Inattention (teacher)  Mean = -0.95 (95% CI: -1.23 to ‑0.68)  SWAN-Hyperactivity/Impulsiveness (teacher)  Mean = -0.70 (95% CI: -1.05 to ‑0.34) |
| Barragan, 201427  90  Poor  RCT  b | Any subtype  DSM-IV-TR  6-12 years  67.0% Male | MPH (maximum 1 mg/kg/day) | Omega-3/6 fatty acid supplementation (6 capsules/day)  MPH (maximum 1 mg/kg/day and omega-3/6 fatty acid supplementation (6 capsules/day) | 1 year | Irritability by the end of the study period (clinical assessment)  % patients with outcome = 23.33 | Irritability by the end of the study period (clinical assessment)  % patients with outcome = 0  Irritability by the end of the study period  % patients with outcome = 0 |
| Li, 201128  72  Good  RCT  b | NR  DSM-IV  6-13 years  65.3% Male | MPH 1 mg/kg/day | Ningdong granule (a traditional Chinese medicine preparation) | 8 weeks | Anxiety  # patients with outcome = 5 | Anxiety  # patients with outcome = 1 |
| **Changes in appetite** | | | | | | |
| Barragan, 201427  90  Poor  RCT  b | Any subtype  DSM-IV-TR  6-12 years  67.0% Male | MPH (maximum 1 mg/kg/day) | Omega-3/6 fatty acid supplementation (6 capsules/day)  MPH (maximum 1 mg/kg/day and omega-3/6 fatty acid supplementation (6 capsules/day) | 1 year | Appetite suppression by the end of the study period  % patients with outcome = 70 | Appetite suppression by the end of the study period  % patients with outcome = 33.3  Appetite suppression by the end of the study period  % patients with outcome = 6.7 |
| Li, 201128  72  Good  RCT  b | NR  DSM-IV  6-13 years  65.3% Male | MPH 1 mg/kg/day | Ningdong granule (a traditional Chinese medicine preparation) | 8 weeks | Decreased appetite  # patients with outcome = 13  Increased appetite  # patients with outcome = 4 | Decreased appetite  # patients with outcome = 1  Increased appetite  # patients with outcome = 5 |
| Salehi, 201029  50  Good  RCT  b | Combined Type  DSM-IV-TR  6-14 years  78% Male | MPH (up to 30 mg/day) | Ginkgo biloba | 6 weeks | Decreased appetite  # patients with outcome = 5 | Decreased appetite  # patients with outcome = 19 |
| **Changes in standardized symptom scores** | | | | | | |
| Barragan, 201427  90  Poor  RCT  b | Any subtype  DSM-IV-TR  6-12 years  67.0% Male | MPH (maximum 1 mg/kg/day) | Omega-3/6 fatty acid supplementation (6 capsules/day)  MPH (maximum 1 mg/kg/day and omega-3/6 fatty acid supplementation (6 capsules/day) | 1 year | ADHD-RS total score – 6 month  Mean = 25.43 (SD = 4.84)  ADHD-RS inattention – 6 months  Mean = 11.73 (SD = 1.78)  ADHD- RS hyperactivity – 6 months Mean = 13.7 (SD = 3.71)  ADHD- RS – total – 12 month  Mean = 25.83 (SD = 4.67)  ADHD-RS inattention – 12 month  Mean = 12.03 (SD = 1.71)  ADHD-RS hyperactive – 12 month  Mean = 13.8 (SD = 3.68) | ADHD-RS total score – 6 month  Mean = 28.17 (SD = 7.92)  ADHD-RS inattention – 6 months  Mean = 12.33 (SD = 2.83)  ADHD-RS hyperactivity – 6 months Mean = 15.83 (SD = 5.78)  ADHD-RS – total – 12 month  Mean = 27.77 (SD = 7.84)  ADHD-RS inattention – 12 month  Mean = 12.17 (SD = 2.7)  ADHD-RS hyperactive – 12 month  Mean = 15.6 (SD = 5.68)  ADHD-RS total score – 6 month  Mean = 25.5 (SD = 5.01)  ADHD-RS inattention – 6 months  Mean = 11.7 (SD = 2.17)  ADHD-RS hyperactivity – 6 months Mean = 13.8 (SD = 3.28)  ADHD-RS – total – 12 month  Mean = 24.33 (SD = 5.09)  ADHD-RS inattention – 12 month  Mean = 11.3 (SD = 1.95)  ADHD-RS hyperactive – 12 month  Mean = 13.03 (SD = 3.44) |
| Duric 201230  (Duric, 201431)  91  Poor  RCT  b | Attention and Hyperactive  ICD-10 Diagnosis Criteria  6-18 years  80% Male | MPH (dose not reported)  MPH + Neurofeedback | Neurofeedback | 10 weeks | Total: Barkley Rating Scale for parent’s  Mean w/in group change = 7.9  95% CI = 4.5-11.4  p=0.31 | Total: Barkley Rating Scale for parent’s  Mean w/in group change = 8.6  95% CI = 5.0-12.2 |
| Li, 201128  72  Good  RCT  b | NR  DSM-IV  6-13 years  65.3% Male | MPH 1 mg/kg/day | Ningdong granule (a traditional Chinese medicine preparation) | 8 weeks | ADHD-RS Parent  Mean w/in group change = 13.3 (SD = 3.2) | ADHD-RS Parent  Mean w/in group change = 14.1 (SD = 2.9) |
| Salehi, 201029  50  Good  RCT  b | Combined Type  DSM-IV-TR  6-14 years  78% Male | MPH (up to 30 mg/day) | Ginkgo biloba | 6 weeks | Parent ADHD Rating Scale-IV  Mean = 26 ( 13,38)  p<0.01  Teacher ADHD Rating Scale-IV  Mean = 25 (15,35)  p<0.001 | Parent ADHD Rating Scale-IV  Mean = 16 ( 5, 27)  Teacher ADHD Rating Scale-IV  Mean = 11 (4, 20) |
| Moreno-Garcia, 201532  57  Fair  RCT  b | Combined, Inattentive and Hyperactive/Impulsive  DSM-V  7-14 years  77.2% Male | Standard Pharmacological Treatment | Neurofeedback  Behavioral treatment | 20 weeks | Integrated Visual and Auditory Continuous Performance Test (IVA/CPT) – Full Scale Attention  Mean = 2.1 (SD = 16.88)  p=.002  p=0.013 | Integrated Visual and Auditory Continuous Performance Test (IVA/CPT) – Full Scale Attention  Mean = -28.57 (SD = 11.67)  Integrated Visual and Auditory Continuous Performance Test (IVA/CPT) – Full Scale Attention  Mean = -3.88 (SD = 16.24) |
| **Chemical leukoderma** | | | | | | |
| Li, 201128  72  Good  RCT  b | NR  DSM-IV  6-13 years  65.3% Male | MPH 1 mg/kg/day | Ningdong granule (a traditional Chinese medicine preparation) | 8 weeks | ADHD-RS Teacher  Mean w/in group change =  12.3 (SD = 3.1) | ADHD-RS Teacher  Mean w/in group change =  13.9 (SD = 2.3) |
| **Depression or anxiety** | | | | | | |
| Salehi, 201029  50  Good  RCT  b | Combined Type  DSM-IV-TR  6-14 years  78% Male | MPH (up to 30 mg/day) | Ginkgo biloba | 6 weeks | Sadness  # patients with outcome = 2  Anxiety  # patients with outcome = 7 | Sadness  # patients with outcome = 7  Anxiety  # patients with outcome = 9 |
| Molina, 200924  (Vitiello, 201225)  579  Fair  RCT  b | Combined Type  DSM-IV  7.0-9.9 years 80% Male | Medication management | Behavioral training (parent group, parent individual, classroom (student), and teacher sessions)  Combination: Medication management and Behavioral training  Usual care | 8 years | Depression (CDI)  Mean = 5.78 (SD = 7.84)  Anxiety (MASC)  Mean = 77.7 (SD = 14.9) | Depression (CDI)  Mean = 7.84 (SD = 7.24)  Anxiety (MASC)  Mean = 82.8 (SD = 16.7)  Depression (CDI)  Mean = 8 (SD = 7.66)  Anxiety (MASC)  Mean = 84.1 (SD = 18.3)  Depression (CDI)  Mean = 7.19 (SD = 7.73)  Anxiety (MASC)  Mean = 85.8 (SD = 19.7) |
| **Elevated blood pressure** | | | | | | |
| Molina, 200924  (Vitiello, 201225)  579  Fair  RCT  b | Combined Type  DSM-IV  7.0-9.9 years 80% Male | Medication management | Behavioral training (parent group, parent individual, classroom (student), and teacher sessions)  Combination: Medication management and Behavioral training  Usual care | 8 years | SBP at 14 months  Mean = 102.4 (SD = 9.7)  DBP at 14 months  Mean = 67.6 (SD = 9.6) | SBP at 14 months  Mean = 103.2 (SD = 10.3)  DBP at 14 months  Mean = 68.9 (SD = 9.1)  SBP at 14 months  Mean = 102.6 (SD = 10.2)  DBP at 14 months  Mean = 66.5 (SD = 10.4)  SBP at 14 months  Mean = 104.1 (SD = 10.6)  DBP at 14 months  Mean = 67.8 (SD = 8.8) |
| **Functional impairment** | | | | | | |
| Barragan, 201427  90  Poor  RCT  b | Any subtype  DSM-IV-TR  6-12 years  67.0% Male | MPH (maximum 1 mg/kg/day) | Omega-3/6 fatty acid supplementation (6 capsules/day)  MPH (maximum 1 mg/kg/day and omega-3/6 fatty acid supplementation (6 capsules/day) | 1 year | CGI-severity – parents- 6 months  Mean = 4 (SD = 0.98)  CGI-clinician – 6 months  Mean = 4 (SD = 1.08)  CGI-parent – 12 month  Mean = 4.1 (SD = 1.06)  CGI-clinician – 12 month  Mean = 4.1 (SD = 1.06) | CGI-severity – parents- 6 months  Mean = 3.97 (SD = 1.33)  CGI-clinician – 6 months  Mean = 4.1 (SD = 1.32)  CGI-parent – 12 month  Mean = 3.7 (SD = 1.51)  CGI-clinician – 12 month  Mean = 3.7 (SD = 1.51)  CGI-severity – parents- 6 months  Mean = 3.23 (SD = 0.866)  CGI-clinician – 6 months  Mean = 3.23 (SD = 0.86)  CGI-parent – 12 month  Mean = 3.63 (SD = 0.85)  CGI-clinician – 12 month  Mean = 3.63 (SD = 0.85) |
| **Gastrointestinal symptoms** | | | | | | |
| Barragan, 201427  90  Poor  RCT  b | Any subtype  DSM-IV-TR  6-12 years  67.0% Male | MPH (maximum 1 mg/kg/day) | Omega-3/6 fatty acid supplementation (6 capsules/day)  MPH (maximum 1 mg/kg/day and omega-3/6 fatty acid supplementation (6 capsules/day) | 1 year | Dyspepsia by the end of the study period  % patients with outcome = 0 | Dyspepsia by the end of the study period  % patients with outcome = 0  Dyspepsia by the end of the study period  % patients with outcome = 40 |
| Li, 201128  72  Good  RCT  b | NR  DSM-IV  6-13 years  65.3% Male | MPH 1 mg/kg/day | Ningdong granule (a traditional Chinese medicine preparation) | 8 weeks | Nausea  # patients with outcome = 16  Stomach pain  # patients with outcome = 12 | Nausea  # patients with outcome = 2  Stomach pain  # patients with outcome = 2 |
| **Incarceration** | | | | | | |
| Molina, 200924  (Vitiello, 201225)  579  Fair  RCT  b | Combined Type  DSM-IV  7.0-9.9 years 80% Male | Medication management | Behavioral training (parent group, parent individual, classroom (student), and teacher sessions)  Combination: Medication management and Behavioral training  Usual care | 8 years | Arrested once  % patients with outcome = 22.4  p=.735  Arrested 2 or more times  % patients with outcome = 10.3  p=.735 | Arrested once  % patients with outcome = 17.4  Arrested 2 or more times  % patients with outcome = 7.8  Arrested once  % patients with outcome = 18.9  Arrested 2 or more times  % patients with outcome = 5.7  Arrested once  % patients with outcome = 22.9  Arrested 2 or more times  % patients with outcome = 7.8 |
| **Increased heart rate** | | | | | | |
| Molina, 200924  (Vitiello, 201225)  579  Fair  RCT  b | Combined Type  DSM-IV  7.0-9.9 years 80% Male | Medication management | Behavioral training (parent group, parent individual, classroom (student), and teacher sessions)  Combination: Medication management and Behavioral training  Usual care | 14 months | Heart rate at 14 months  Mean = 84.2 (SD = 12.4)  Incidence of Tachycardia at 14 months  % patients with outcome = .8 | Heart rate at 14 months  Mean = 79.1 (SD = 12)  Incidence of Tachycardia at 14 months  % patients with outcome = .8  Heart rate at 14 months  Mean = 84.6 (SD = 12.2)  Incidence of Tachycardia at 14 months  % patients with outcome = 2.2  Heart rate at 14 months  Mean = 78.9 (SD = 12.9)  Incidence of Tachycardia at 14 months  % patients with outcome = 2.5 |
| **Motor vehicle collisions** | | | | | | |
| Molina, 200924  (Vitiello, 201225)  579  Fair  RCT  b | Combined Type  DSM-IV  7.0-9.9 years 80% Male | Medication management | Behavioral training (parent group, parent individual, classroom (student), and teacher sessions)  Combination: Medication management and Behavioral training  Usual care | 8 years | Accidents, citations, ticket  % patients with outcome = 28.6 | Accidents, citations, ticket  % patients with outcome = 19.7  Accidents, citations, ticket  % patients with outcome = 19  Accidents, citations, ticket  % patients with outcome = 21.5 |
| **Sleep disturbance** | | | | | | |
| Barragan, 201427  90  Poor  RCT  b | Any subtype  DSM-IV-TR  6-12 years  67.0% Male | MPH (maximum 1 mg/kg/day) | Omega-3/6 fatty acid supplementation (6 capsules/day)  MPH (maximum 1 mg/kg/day and omega-3/6 fatty acid supplementation (6 capsules/day) | 1 year | Insomnia by the end of the study period  % patients with outcome = 20 | Insomnia by the end of the study period  % patients with outcome = 0  Insomnia by the end of the study period  % patients with outcome = 0 |
| Gelade, 201626  112  Good  RCT  b | Combined Type  DSM-IV-TR  9.63 years (SD1.76)  76% Male | Neurofeedback  training | MPH | 12 weeks | SDSC  Mean = -2.16 (95% CI: -4.82, 0.51) | SDSC  Mean = -0.54 (95% CI: -2.90, 1.81) |
| Li, 201128  72  Good  RCT  b | NR  DSM-IV  6-13 years  65.3% Male | MPH 1 mg/kg/day | Ningdong granule (a traditional Chinese medicine preparation) | 8 weeks | Trouble falling asleep  # patients with outcome = 9  Hypersomnia  # patients with outcome = 0 | Trouble falling asleep  # patients with outcome = 1  Hypersomnia  # patients with outcome = 6 |
| Salehi, 201029  50  Good  RCT  b | Combined Type  DSM-IV-TR  6-14 years  78% Male | MPH (up to 30 mg/day) | Ginkgo biloba | 6 weeks | Insomnia  # patients with outcome = 3 | Insomnia  # patients with outcome = 12 |
| **Weight decrease** | | | | | | |
| Salehi, 201029  50  Good  RCT  b | Combined Type  DSM-IV-TR  6-14 years  78% Male | MPH (up to 30 mg/day) | Ginkgo biloba | 6 weeks | Weight loss  # patients with outcome = 3 | Weight loss  # patients with outcome = 8 |

a See Methods section “Quality Assessment of Individual Studies” for definitions of quality assessment ratings.

b Age categories: a = children aged ≤6 years, b = children aged 7-17, c = children of all ages ≤17.

Abbreviations: CDI=Children’s Depression Inventory; DSM=Diagnostic and Statistical Manual of Mental Disorders; MASC=Multidimensional Anxiety Scale for Children; MPH=methylphenidate; WIAT=Wechsler Individual Achievement Test