Dementia care research: Dementia care - caregiving

Internet-based supportive interventions for family caregivers of people with dementia: A systematic review and meta-analysis

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Abstract

**Background:** Family caregivers of people with dementia always experience high levels of psychological burden and physical strain, so effective and practical support is essential. Internet-based interventions can provide convenient and efficient support and education to potentially reduce the physical and psychological burden associated with providing care. This review aimed to (1) assess the efficacy of internet-based supportive interventions in ameliorating health outcomes for family caregivers of people with dementia, and (2) evaluate potential effects of internet-based supportive interventions access by caregivers on their care recipients.

**Method:** An electronic literature search was conducted in the PubMed, Embase, Web of Science, CINAHL, Cochrane Library, and PsycINFO databases to identify relevant studies that were published up to November 2019. The two reviewers worked independently to identify randomized controlled trials (RCTs) that met the inclusion criteria and extracted data independently. The quality of the included RCTs was evaluated using the approach recommended by the Cochrane Handbook for systematic reviews of interventions. Standardized mean difference (SMD) with 95% CI was applied to calculate the pooled effect sizes.

**Result:** In total, fifteen RCTs met the eligibility criteria and were included in this systematic review. The meta-analysis showed that internet-based supportive interventions significantly ameliorated depressive symptoms (SMD = -0.20; 95% CI -0.31 to -0.10; p = 0.0002), perceived stress (SMD = -0.36; 95% CI -0.53 to -0.19; p < 0.0001), anxiety (SMD = -0.33; 95% CI -0.51 to -0.16; p = 0.0002), and self-efficacy (SMD = 0.19; 95% CI 0.05 to 0.33; p = 0.007) in dementia caregivers. No significant improvements were found in caregiver burden or coping ability. Three studies assessed the unintended effects of internet-based supportive interventions access by caregivers on their care recipients. The results showed that internet-based supportive interventions had potential benefits on the quality of life and neuropsychiatric symptoms in care recipients.
Conclusion: Internet-based supportive interventions were generally effective at ameliorating depressive symptoms, perceived stress, anxiety, and self-efficacy in dementia caregivers, although negative results were found in some RCTs. Future researchers are encouraged to adopt personalized internet-based supportive interventions to improve the health of family caregivers and their care recipients.

### FIGURE 1

| Study or Subgroup       | Experimental Mean | SD | Total | Control Mean | SD | Total | Weight | Std. Mean Difference IV, Fixed, 95% CI | std. Mean Difference IV, Fixed, 95% CI |
|-------------------------|-------------------|----|-------|--------------|----|-------|--------|----------------------------------------|----------------------------------------|
| Beauchamp et al. 2005   | -1.4              | 10.6 | 150   | 1.0          | 11.05| 149   | 22.4%  | -0.22 [-0.45, 0.01]                    |                                        |
| Blom et al. 2015        | -2.35             | 8.21 | 90    | 0.34         | 7.51 | 85    | 13.0%  | -0.34 [-0.84, 0.004]                  |                                        |
| Brennan et al. 1995     | -2.3              | 9.87 | 47    | 0.1          | 10.55| 49    | 7.2%   | -0.23 [-0.63, 0.17]                   |                                        |
| Cristancho-Lacroix et al. 2015 | 0.3      | 4.6  | 25    | -0.1         | 2.7  | 24    | 3.7%   | 0.10 [0.46, 0.68]                     |                                        |
| Gustafson et al. 2019   | -0.1              | 0.77 | 14    | -0.09        | 0.82 | 11    | 1.9%   | -0.01 [0.80, 0.78]                    |                                        |
| Kajiyama et al. 2013    | -2.52             | 7.82 | 46    | -0.77        | 8.66 | 57    | 7.6%   | -0.21 [0.60, 0.18]                    |                                        |
| Meichsner et al. 2019   | -1.42             | 8.58 | 15    | -0.79        | 9.25 | 15    | 2.3%   | -0.07 [0.78, 0.65]                    |                                        |
| Núñez-Naveira et al. 2016 | -2.37           | 8.23 | 30    | -0.65        | 8.84 | 31    | 4.6%   | -0.20 [-0.70, 0.30]                   |                                        |
| Possin et al. 2019      | -0.69             | 4.24 | 357   | 0.07         | 3.77 | 190   | 37.3%  | -0.19 [-0.36, -0.01]                  |                                        |
| **Total (95% CI)**      |                   |     | **774** |             |     |       | **611** | **100.0%** | **-0.20 [-0.31, -0.10]** | **-0.20 [-0.31, -0.10]** |

Heterogeneity: $\chi^2 = 2.40, df = 8 (P = 0.97); I^2 = 0%$

Test for overall effect: $Z = 3.69 (P = 0.0002)$

### FIGURE 2

| Study or Subgroup       | Experimental Mean | SD | Total | Control Mean | SD | Total | Weight | Std. Mean Difference IV, Fixed, 95% CI | std. Mean Difference IV, Fixed, 95% CI |
|-------------------------|-------------------|----|-------|--------------|----|-------|--------|----------------------------------------|----------------------------------------|
| Beauchamp et al. 2005   | -3.4              | 7.07 | 150   | -0.7         | 6.72 | 149   | 55.0%  | -0.39 [-0.82, -0.16]                   |                                        |
| Cristancho-Lacroix et al. 2015 | -0.5          | 0.5  | 25    | -0.7         | 4.5  | 24    | 9.2%   | 0.03 [0.53, 0.59]                      |                                        |
| Hattink et al. 2015     | -4.59             | 5.91 | 27    | -0.86        | 5.74 | 32    | 10.4%  | -0.67 [-1.26, -0.14]                  |                                        |
| Kajiyama et al. 2013    | -2.63             | 5.14 | 46    | 0.19         | 7.01 | 57    | 18.6%  | -0.45 [-0.84, -0.05]                  |                                        |
| Torkamani et al. 2014   | -0.38             | 5.44 | 17    | -0.65        | 4.13 | 20    | 6.6%   | 0.06 [0.59, 0.70]                      |                                        |
| **Total (95% CI)**      |                   |     | **265** |             |     |       | **282** | **100.0%** | **-0.36 [-0.53, -0.19]** | **-0.36 [-0.53, -0.19]** |

Heterogeneity: $\chi^2 = 5.05, df = 4 (P = 0.28); I^2 = 21%$

Test for overall effect: $Z = 4.17 (P < 0.0001)$

### FIGURE 3

| Study or Subgroup       | Experimental Mean | SD | Total | Control Mean | SD | Total | Weight | Std. Mean Difference IV, Fixed, 95% CI | std. Mean Difference IV, Fixed, 95% CI |
|-------------------------|-------------------|----|-------|--------------|----|-------|--------|----------------------------------------|----------------------------------------|
| Beauchamp et al. 2005   | -0.9              | 5.7  | 150   | 0.9          | 6.4  | 149   | 60.2%  | -0.30 [0.52, -0.07]                    |                                        |
| Blom et al. 2015        | -1.06             | 3.26 | 90    | -0.47        | 3.41 | 86    | 36.0%  | -0.36 [-0.66, -0.07]                   |                                        |
| Gustafson et al. 2019   | -0.28             | 0.18 | 14    | 0.05         | 0.81 | 11    | 4.9%   | -0.56 [-1.39, 0.23]                   |                                        |
| **Total (95% CI)**      |                   |     | **254** |             |     |       | **245** | **100.0%** | **-0.33 [-0.51, -0.16]** | **-0.33 [-0.51, -0.16]** |

Heterogeneity: $\chi^2 = 0.50, df = 2 (P = 0.78); I^2 = 0%$

Test for overall effect: $Z = 3.70 (P = 0.0002)$
FIGURE 4

FIGURE 5

FIGURE 6