Conversion of Δ Values to Absolute Values in Meta-Analysis

To ensure consistency across studies, all outcome variables were converted to absolute post-intervention values whenever original data were reported as change-from-baseline (Δ values). This standardization was essential for valid pooling in the meta-analyses, as several studies provided only Δ values without reporting post-intervention levels directly. The absolute mean values were calculated using the formula:

$$\text{Mean_absolute} = \text{Mean_baseline} + \Delta\text{Mean}$$

Standard deviations for the absolute values were computed by combining the reported baseline SD and the SD of the Δ values, assuming independence, using:

$$\text{SD_absolute} = \text{sqrt}((\text{SD_baseline})^2 + (\text{SD_}\Delta)^2)$$

When only the 95% confidence intervals (CIs) of Δ values were available, SDs were estimated as:

$$\text{SD} \approx (\text{Upper CI} - \text{Lower CI}) \,/\, (2 \times 1.96)$$

These conversions enabled harmonized input data for each meta-analysis and enhanced the interpretability and robustness of the pooled results. The converted values used for the meta-analyses are detailed in Supplementary Table X.