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  – Learners must attends the full activity and complete the evaluation in order to claim continuing education credit/hours
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Systematic Review of the Impact of Diabetes Self-Management Education on Glycemic Control in Adults with Type 2 Diabetes

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Type 2 Diabetes

- Modifiable risk factors
  - Obesity
  - Physical Inactivity
- Non-modifiable risk factors
  - Genetics (family history)
  - Increasing age
  - Gestational diabetes
  - Non-white race or ethnicity

Prevalence

- Type 1 Diabetes
- Type 2 Diabetes
**Need Documented**

*Annals of Internal Medicine 2015*
- Lifestyle changes are the cornerstones of managing type 2 diabetes

*AACE Glycemic Control Algorithm 2013*
- Lifestyle Modification (Including Medically Assisted Weight Loss)

*ADA: Standards of Medical Care in Diabetes 2015*
- DSME and DSMS foundational in diabetes care

**Using the Guidelines**

- Provides the evidence base for the value of education and the current referral patterns
- Ties the referral to the 4 critical times that education is critical
- Provides the objective criteria for referral
- Provides the HCP with the framework to make a referral and what to expect from the referral

**Self-Management Education**

- Critical for patients to engage in self-management behaviors
- Knowledge acquisition has been shown to be insufficient to bring about behavior change
- Thus the purpose of this systematic review on DSME/S:
  - Does the provision of quality DSME/DSMS improve glycemic control?
  - Can the evidence base provide insight to define what quality DSME/DSMS looks like?

**2015 Systematic Review of the Literature**

- Processes
- Methodology
- Options
- Outcomes
Why a Systematic Review?
• Systematic effort to collate all the empirical evidence that fits pre-specified eligibility criteria to answer a specific research question.

Uniformity would be nice

Factors Contributing to DSME Heterogeneity
• Age of participants
• Time since diagnosis
• Level of glycemic control
• Program intensity
• Delivery personnel
• Method of delivery
• Practice Setting
• Socioeconomic
• Race

Search Restrictions
• English-language only including US and international studies
• Published between 1 January 1997 to 30 June 2013

Database Search of Published Literature
• Cumulative Index to Nursing and Allied Health Literature (CINAHL)
• Educational Resources Information Center (ERIC)
• EMBASE
• Medline/PubMed
• Cochrane Database of Systematic Reviews
• PsycINFO

Manual Searches
• Review articles
• Reference lists of publications that meet inclusion criteria
• Contacts with selected authors of relevant studies and other subject matter experts to identify additional references.
Excluded Data Sources

- Dissertations
- Meeting abstracts
- Unpublished studies
- Studies published in non-peer reviewed journals
- Newspaper and magazine articles

Medical Subject Headings (MeSH)

- Type 2 diabetes
- Self-care education
- Self-management
- Behavior change

Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA)

- assess the benefits and harms of a health care intervention
- ensure the transparent and complete reporting of systematic reviews and meta-analyses

Systematic Review

- Review of a clearly formulated question that uses systematic and explicit methods to identify, select, and critically appraise relevant research, and to collect and analyze data from the studies that are included in the review.

Meta-analysis

- The use of statistical techniques in a systematic review to integrate the results of included studies.
Records identified through database search \( (n = 2725) \)

Additional records identified through other sources \( (n = 17) \)

Records after removal of duplicates \( (n = 2821) \)

Records screened \( (n = 2095) \)

Records excluded \( (n = 274) \)

Full-text articles excluded, with reasons \( (n = 154) \)
- Study Design: \( (22; 14.3\%) \)
- Inappropriate endpoints: \( (29; 18.8\%) \)
- Not DSME: \( (33; 21.4\%) \)
- Inappropriate control group: \( (24; 15.6\%) \)
- Other*: \( (46; 29.9\%) \)

*Research protocol, guidelines, position paper, meta-analysis, systematic review, or inappropriate analysis

Figure A: Summary of evidence identification and selection for study inclusion

**PICOS question**

<table>
<thead>
<tr>
<th>PICOS component</th>
<th>Study question</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P</strong></td>
<td>Adult patients with Type-2 diabetes</td>
</tr>
<tr>
<td><strong>I</strong></td>
<td>Diabetes Self-Management Education</td>
</tr>
<tr>
<td><strong>C</strong></td>
<td>Usual care</td>
</tr>
<tr>
<td><strong>O</strong></td>
<td>A1C</td>
</tr>
<tr>
<td><strong>S</strong></td>
<td>Randomized controlled trials</td>
</tr>
</tbody>
</table>

**Population**
- 18 years or older
- Clinical diagnosis of type 2 diabetes
- Any degree of diabetes duration and severity
- Any comorbidities

**Intervention**
- Group interactive
- Group lecture
- One-to-one
- Internet/online
- Mobile health application (e.g., mobile apps, Skype)
- Telephone

**Comparison Group**
- Routine treatment OR
- Usual care OR
- No intervention

**Outcome Measure**
- Hemoglobin A1C level
Setting

• Randomized controlled trial
• Controlled clinical trial
• DSME had to include an element of patient centric goal setting

DSME Definition Based Exclusion

• Interventions limited to medical nutritional education or training (MNT) OR
• Interventions limited to medication therapy management (MTM)

Data Extraction

• Two independent reviewers scan titles, abstracts, and key words of every record retrieved from database search process
• CINAHL: 495
• EMBASE: 1075
• ERIC: 46
• PsychInfo: 758
• PubMed: 2058

Doing the math.....

<table>
<thead>
<tr>
<th>Step removal of duplicate</th>
<th>2032 papers screened</th>
</tr>
</thead>
<tbody>
<tr>
<td>Publications excluded</td>
<td>2821</td>
</tr>
<tr>
<td>Full-text publications assessed for eligibility</td>
<td>274</td>
</tr>
<tr>
<td>Publications included¹</td>
<td>120</td>
</tr>
<tr>
<td>Number of interventions²</td>
<td>118</td>
</tr>
</tbody>
</table>

¹ Several publications reported follow-up outcomes on earlier papers; the information on earlier and later outcomes were counted as a single intervention
² Several publications reported outcomes on 2 or more intervention groups; each group was counted as a unique intervention

Additional Areas of Heterogeneity

• Length of follow-up
• Quality of the study
Study Quality: AHRQ’s methodology

- Bias
- Consistency
- Directness
- Precision

Participants

<table>
<thead>
<tr>
<th>Intervention Group (SD)</th>
<th>Usual Care Controls (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Age</td>
<td></td>
</tr>
<tr>
<td></td>
<td>58.5(5.21)</td>
</tr>
<tr>
<td>Mean Baseline A1C</td>
<td>8.55(1.11)</td>
</tr>
<tr>
<td>Number Enrolled</td>
<td>11,854</td>
</tr>
<tr>
<td>Number at Follow-up A1C</td>
<td>11,584</td>
</tr>
</tbody>
</table>

Outcome (A1C) Reduction Based on the Mode of DSME Delivery

<table>
<thead>
<tr>
<th>Mode</th>
<th>Number of Interventions (SD)</th>
<th>Intervention (SD)</th>
<th>Control (SD)</th>
<th>Absolute Difference in A1C with the addition of DSME</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Models Together</td>
<td>118</td>
<td>-0.74(0.43)</td>
<td>-0.17(0.51)</td>
<td>0.57</td>
</tr>
<tr>
<td>Combination</td>
<td>22</td>
<td>-1.20(0.43)</td>
<td>-0.22(0.62)</td>
<td>0.88</td>
</tr>
<tr>
<td>Group</td>
<td>33</td>
<td>-0.62(0.45)</td>
<td>-0.10(0.42)</td>
<td>0.53</td>
</tr>
<tr>
<td>Individual</td>
<td>47</td>
<td>-0.78(0.43)</td>
<td>-0.28(0.46)</td>
<td>0.50</td>
</tr>
<tr>
<td>Remote</td>
<td>12</td>
<td>-0.50(0.47)</td>
<td>-0.17(0.46)</td>
<td>0.33</td>
</tr>
</tbody>
</table>

Change in A1C Single versus Team DSME

<table>
<thead>
<tr>
<th>Provider</th>
<th>Number of Interventions (SD)</th>
<th>Intervention (SD)</th>
<th>Control (SD)</th>
<th>Absolute Difference in A1C with the addition of DSME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>49</td>
<td>-0.76(0.43)</td>
<td>-0.17(0.49)</td>
<td>0.57</td>
</tr>
<tr>
<td>Team</td>
<td>46</td>
<td>-0.74(0.43)</td>
<td>-0.16(0.42)</td>
<td>0.56</td>
</tr>
</tbody>
</table>
Summary

- Engaging adults with type 2 diabetes in DSME results in statistically significant and clinically meaningful improvement in A1C.
- These data demonstrate that DSME that involves both group and individualized engagement results in the greatest improvement in A1C.
- The data suggest that there is a greater likelihood of DSME resulting in statistically significant improvement when a team rather than a single individual is involved in its provision.
- The data suggest that limiting DSME contact time to 10 hours may not be sufficient.

Real World Context

- Data from CDC indicates that 6.8% of adults with diabetes who have private insurance engage in DSME during the year in which they are diagnosed.
- Data from CMS indicates that 5% of adults with diabetes covered by Medicare engage in DSME during the year in which they are diagnosed.
- Data from NHANES: 45% of people with diabetes do not achieve glycemic targets.

References:

\[\text{Li R, et al. (2014)}\]
\[\text{Strawbridge LM, et al. (2015)}\]
\[\text{Hoerger TJ, et al. (2008)}\]