

## Research Paper Review Form

(Adopted from the Academy Evidence Analysis Manual, Chapter 3. Critically Appraise Each Article, pp39-58)

Date: 03/09/18

Name: Caroline Awtry, Carlee Collmus, Marisa Smith, & Caroline Taylor

<b>Suggested Contents</b>		<b>Points</b>
<b>Citation:</b>	Jakicic, J.M., Davis, K.K., Rogers, R.J., King, W.C., Marcus, M.D., Helsel, D., Rickman, A.D., Wahed, A.S., Belle, S.H. (2016). Effect of Wearable Technology Combined With a Lifestyle Intervention on Long-term Weight Loss: The IDEA Randomized Clinical Trial. <i>JAMA</i> , 316(11), pp.1161-1171. Retrieved from <a href="https://www.ncbi.nlm.nih.gov/pubmed/27654602">https://www.ncbi.nlm.nih.gov/pubmed/27654602</a>	1
<b>Study Design:</b>	Randomized Control Trial	1
<b>Class:</b>	Class I	1
<b>Quality Rating:</b>	This study is a (+) positive rating.	1
<b>Research Purpose:</b>	To determine if wearable technologies will result in greater weight loss than standard behavioral weight loss intervention.	1
<b>Inclusion Criteria:</b>	Requirement for study eligibility: <ul style="list-style-type: none"> <li>• Age 18-35</li> <li>• BMI 25-40</li> <li>• Access to a cell phone capable of texting</li> <li>• Computer with internet access</li> </ul>	1

<b>Exclusion Criteria:</b>		<ul style="list-style-type: none"> <li>• Items that disqualify an individual from participation in study</li> <li>• Individuals under age 18 or above age 40</li> <li>• BMI under 25 or above 40</li> <li>• No access to cell phone or texting technology</li> </ul>	1
<b>Description of Study Protocol:</b>	Recruitment or sampling	<ul style="list-style-type: none"> <li>• 10 recruitment periods over the span of 2 years (October 2010-2012)</li> <li>• Via mail, mass media advertisements, clinical research registry referrals</li> </ul>	2
	Description of study protocol	<ul style="list-style-type: none"> <li>• First 6 months: both groups participate in behavioral weight loss interventions</li> <li>• After 6 months: <ul style="list-style-type: none"> <li>• Standard group: self-monitoring of diet and PA behaviors</li> <li>• Enhanced group: study website for educational materials, wearable technology with corresponding web interface to monitor PA and diet</li> </ul> </li> </ul>	1
	Intervention (if applicable)	<ul style="list-style-type: none"> <li>• Dietary: kcals prescribed according to baseline weight <ul style="list-style-type: none"> <li>• &lt; 90.7 kg = 1200 kcal/day</li> <li>• 90.7-113.4 kg = 1500 kcal/day</li> <li>• &gt; 113.4 kg = 1800 kcal/day</li> </ul> </li> <li>• Dietary fat = 20-30% of total kcal</li> <li>• PA: initially prescribed at 100 minutes/week, steadily increased in 4 week intervals until reaching 300 minutes/week</li> <li>• Contact: weekly group-based sessions for months 1-6; monthly group-based sessions for months 7-24 (materials posted on website)</li> <li>• Sessions gave feedback and theory-based strategies to enhance weight loss</li> <li>• Months 7-24: participants received weekly or biweekly text messages from interventionists encouraging weight loss, as well as monthly &lt;10 minute phone calls</li> </ul>	1

	Statistical analysis	<ul style="list-style-type: none"> <li>• Standard deviation of 6.8 kg for each group</li> <li>• Statistical significance determined by Wilcoxon test and Pearson X<sup>2</sup></li> <li>• Statistical significance: P &gt; 0.5</li> <li>• Sensitivity analysis took into account observed variables (e.g. intervention group, sex, race, income, employment status, smoking status, depression, ethnicity)</li> </ul>	2
<b>Data Collection Summary:</b>	Timing and method of measurements	<ul style="list-style-type: none"> <li>• Assessed at 0, 6, 12, 18, 24 months</li> <li>• Weight: to the nearest 0.1 kg</li> <li>• Height: only measured at baseline, to nearest 0.1 cm</li> <li>• Body composition: DXA scan</li> <li>• Cardiorespiratory fitness: submaximal graded exercise test on motorized treadmill</li> <li>• Oxygen consumption: metabolic cart</li> <li>• Physical activity (months 1-6): self-monitor using diary turned in each week</li> <li>• Physical activity (months 7-24): worn device for 10+ hr/day measuring METs</li> <li>• Diet (months 1-6): self-monitor using food diary turned in each week</li> <li>• Diet (months 7-24): web-based Dietary History Questionnaire, DietCalc Software</li> <li>• Resting BP: automated system after 5-minutes in seated, resting position</li> <li>• Percent weight loss: calculated at 24 months</li> </ul>	3
	Dependent variables (Outcomes)	<ul style="list-style-type: none"> <li>• Primary outcome: weight change at 24 months</li> <li>• Other outcomes: body composition, fitness, PA, and dietary intake</li> </ul>	1

	Independent variables (intervention or procedure)	<ul style="list-style-type: none"> <li>• The first part of the intervention included: a low-calorie diet, prescribed increase in physical activity, and group counseling sessions</li> <li>• The next phase of the intervention included: telephone counseling sessions, text message prompts, and access to study materials on a website</li> <li>• The next step for participants was to begin self-monitoring of diet and physical activity using a website, and provided with a wearable device to monitor diet and activity as well</li> </ul>	1
	Other variables	<ul style="list-style-type: none"> <li>• Self-report questionnaires regarding sex, education, income, employment status, smoking, alcohol consumption-data that feeds into sensitivity analysis</li> <li>• Race and ethnicity: self-report at baseline</li> <li>• Depression (for safety): 10 item Center for Epidemiology Studies questionnaire</li> </ul>	1
<b>Description of Actual Data Sample:</b>	<p>The mean weight loss of the standard group from baseline to the end of the trial was higher (5.9 vs. 3.5) than the mean weight loss of the enhanced intervention group. The baseline mean weight of the standard group was 95.2 kg and the mean weight of this group at the end of the 24 months was 89.3 kg. The baseline mean weight of the enhanced intervention group was 96.3 kg and the mean weight of this group at the end of the 24 months was 92.8 kg. Out of 471 participants randomized, 233 in the standard intervention and 237 in the enhanced intervention, 74.5% completed the study</p>	3	

<p><b>Summary of Results:</b></p>	<p>The findings most pertinent to the research question is that of body weight change over the 24 month intervention in kg. The mean baseline weight for the standard intervention group was 95.2 kg with a confidence interval of 93.0 - 97.3. This group lost an average of 8.6kg in the first 6 months, -8.3kg after 12 months, -7.3kg after 18 months, and - 5.9kg after 24 months. The mean baseline for the enhanced intervention group was 96.3kg with a confidence interval of 94.2-98.5. This group lost an average of -8.0kg in the first 6 months, - 6.7 after 12 months, -5.4 after 18 months, and -3.5 after 24 months. The P values are: .29 after 6 months, .03 after 12 months, .01 after 18 months, and .002 after 24 months.</p>	<p>4</p>
<p><b>Author Conclusion:</b></p>	<p>Among the chosen study sample of young adults with BMI between 25 and 40, weight loss occurred (over the course of 2 years) when a regular behavioral intervention was supplemented with a wearable technology device. Devices that give feedback on physical activity may not necessarily be better than standard weight loss approaches.</p>	<p>1</p>
<p><b>Funding Source:</b></p>	<ul style="list-style-type: none"> <li>• National Institutes of Health</li> <li>• National Heart, Lung, and Blood Institute</li> </ul>	<p>1</p>
<p><b>Provide comments on strengths and limitations of the study, especially any concerns that affect study validity and generalizability.</b></p>	<p>Those assessing the data were aware that the participants were in a weight loss trial which could introduce bias. Additionally, there is potential for environmental factors to affect the data, which impacts validity and generalizability of the results. Since individuals may be exposed to and live in many unique environments, depending</p>	<p>2</p>

	<p>on job, living conditions, access to grocery stores, stressors, and more, it is difficult to standardize results across future populations.</p> <p>One strength of the study is the 6 month follow-up design of the study so that participants are encouraged to be honest and stay on track for only 6 months at a time instead of looking at it like a 24 month study. Having a study of this length is beneficial because it accounts for slightly longer-term weight loss or weight maintenance, as many people slowly gain weight back following a significant weight loss. Also, having the first six months standardized for weight loss behavioral modification among all participants was a strength as it gave each participant the same starting approach to weight loss.</p>	
<b>Total points</b>	28 (points taken off due to limitations of study listed above)	30