HERO Industry Research Review

Influence of Technology plus Lifestyle Intervention on Long-term Weight Loss

Study Title: Effect of Wearable Technology Combined with a Lifestyle Intervention on Long-term Weight Loss: The IDEA Randomized Clinical Trial

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Study Overview

The use of wearable health tracking devices (wearables) as part of corporate wellness programs has increased rapidly over the past several years; one industry authority estimated 13 million wearables will be incorporated into corporate wellness programs by 2018[1]. Many organizations are looking to wearables to increase the "fun factor" in wellness programs, drive engagement in health behavior change, and improve the health of their employees. While there is some evidence that wearables can support short-term health improvements when combined with a behavioral intervention program, little research exists on the long-term impact of wearables.[2,3] This randomized clinical trial compared the effectiveness of a standard behavioral weight loss intervention with an intervention enhanced by the use of wearables on long-term weight loss and other health outcomes.

Methodology

The study participants included 470 overweight or obese young adults aged 18 to 35 years with access to a cellular telephone that could receive text messages and a computer with internet access. They were randomized into two groups labeled by researchers as the "standard intervention" group and the "technology-enhanced intervention group." Both groups received a

behavioral weight loss intervention for the first six months of the study. For the remaining 18 months of the study, both intervention groups also received telephone counseling sessions, text message prompts, and access to health education materials through the study website. During this portion of the study period, only the technology-enhanced intervention group received a wearable tracker and access to special web-based software to monitor physical activity and dietary intake. The standard intervention group was asked to initiate self-monitoring of diet and physical activity behavior using the study website. Random assignment to the groups was conducted in a way that allowed researchers to control for the potential influence of race and gender on study outcomes. The table below provides a visual diagram of the intervention received by the two study groups.

<table>
<tr><th></th><th>Standard Intervention</th><th>Enhanced Intervention</th></tr>
<tr><td>Months 1 - 6</td><td colspan="2">Weekly group-based sessions
• Theory-based weight loss behavioral intervention focused on physical activity, healthy eating
• Feedback on weight change
• Health education materials complementing weekly topic
• Self-reported food diaries and physical activity turned into study staff each week</td></tr>
<tr><td rowspan="2">Months 7 - 24</td><td colspan="2">• Access to materials posted on website
• Monthly 10-minute phone calls
• 1 to 2 weekly text messages to prompt engagement in weight loss behaviors</td></tr>
<tr><td>• Self-reported daily dietary intake and physical activity using study website</td><td>• Self-reported daily dietary intake using web-based software
• Wearable tracking device tracked daily physical activity
• Feedback on energy expenditure and physical activity from wearable and web-based software</td></tr>
</table>

Outcomes were measured 5 times over the course of the study at Baseline, 6, 12, 18, and 24 months. Outcomes assessed at each time period included:

- Height, weight, BMI
- Body composition from body scan
- Cardiorespiratory fitness with oxygen consumption assessment
- Physical activity monitored with wearable device for 1 week
- Self-reported dietary history using web-based software
- Depression assessment
- Resting blood pressure
- Self-reported health care system use

Results

Both study groups experienced a statistically significant amount of weight change during the study, with the standard intervention group losing more weight than the technology-enhanced intervention group. This finding was counter to the study hypothesis that the technology-enhanced intervention group would lose more weight than the standard intervention group. As observed from the study outcomes table below, when one examines weight loss outcomes at each measurement point in the study, the result is even more compelling. Both groups received the same intervention for the first six months of the study and lost about the same amount of weight after six months, resulting in no statistically significant difference between the groups in terms of the amount of weight lost or percent of weight lost. However, at the 12, 18, and 24-month intervals, the standard intervention group maintained significantly more weight loss than the enhanced intervention group.

Study Weight Loss Outcomes

Measured Outcomes	Standard Intervention Group	Technology-Enhanced Intervention Group
Baseline weight	95.2 kg	96.3 kg
6-month weight change	-8.6 kg (-9.4%)	-8.0 kg (-8.4%)
12-month weight change	-8.3 kg (-8.9%)	-6.7 kg (-7.0%)
18-month weight change	-7.3 kg (-7.9%)	-5.4 kg (-5.6%)
24-month weight change	-5.9 kg (-6.4%)	-3.5 kg (-3.6%)

Both intervention groups significantly improved other health outcomes across the study period including improvements in fat mass, lean mass, percent body fat, bone mineral content, bone mineral density, and cardiorespiratory fitness. However, no differences were detected between the standard and technology-enhanced intervention groups in terms of the magnitude of health improvements. Likewise, both intervention groups had measurable improvements in physical activity levels and caloric intake throughout the 24-month study period; however, there were no statistically significant differences between the standard and technology-enhanced intervention groups.

Study Conclusions

Both intervention groups in the study achieved significant improvements in weight loss and related health outcomes; however, the standard intervention group outperformed the technology-enhanced intervention group in weight loss maintenance. This finding was counter to the study hypothesis that adding wearable technology to the intervention would make it more effective. Both study groups lost statistically and clinically meaningful levels of weight in the first six months of the study, and both groups had difficulty sustaining the initial amounts of weight lost after the first six months. Researchers conducting the study speculate that the type of wearable device selected for the study, which was worn on the upper arm, may not be as effective as more contemporary devices worn on the wrist. Additionally, the information related to physical activity, healthy eating, and weight loss available on the device manufacturer's website was not within the control of the study's researchers and may have

influenced study results. In conclusion, more research is needed to determine how to most effectively use wearable devices to support standard weight loss intervention programs.

Reviewer Commentary

Study Implications

This research study offers several important learnings about weight loss interventions. First, this study outlines a robust weight loss intervention that was effective in helping young adults lose weight after six months and maintain a meaningful amount of weight loss for up to 24 months. Moreover, the intervention tested in this study resulted in greater weight loss and maintenance than another study of young adults that researchers used to benchmark their results. This is good news for employers looking for effective weight loss intervention program designs. Second, the finding that both groups lost weight and kept it off is meaningful. However, the use of the technology-enhanced intervention appeared to be effective initially, but appeared less effective over time. Study researchers speculated that there may have been less robust information provided on the device manufacturer's website, where the study's device-wearers were more likely to visit, than the study website that the standard intervention group had to visit weekly to input their physical activity and dietary intake. Readers of the study are not told much about the differences between the content and tools on the study website versus the device manufacturer's website, so we can only speculate about how these differences may have influenced the study results. Another possible explanation for the study findings is that manually submitting the activity data to the website by study participants in the standard intervention group may have reinforced behavior whereas no additional effort was required from participants in the technology-enhanced intervention group to upload the wearable data.

Application for Employers

Given the study's findings, what would a researcher recommend to an employer with regard to their own wearable strategy? The key conclusion from this study is that incorporating wearables into a comprehensive behavior change strategy may result in weight loss, but more research is needed to determine if they provide an advantage over behavior change programs

that require more manual physical activity tracking as part of the intervention. It's true that this study did not demonstrate that wearable devices were able to boost weight loss efforts when combined with an already effective standard intervention. However, that does not mean all wearables are ineffective. The lead researcher for the study cautions that there is a lot we don't know about how to use wearables most effectively. Lead study author, Dr. Jakicic, was quoted saying, "we should not send the message that these wearable technologies do not help with weight loss – there were some in our study for whom it made a difference. There is so much more that we need to learn about how these devices lead to behavior change."[4] More real-world, applied research is needed using scenarios that accurately reflect the quality and innovation many employers are applying to technology-enhanced wellness programs.

Today's most innovative technology-supported employer wellness programs have some advantages that the study researchers did not have, including participants' choice from an array of wearable devices, the ability to sync device data with the employer's preferred wellness program platform, control over the content on the intervention program's website, and customization of the web-based platform to suit employees' preferences. We cannot judge how the study results for the technology-based intervention group may have differed if participants had been allowed to choose a device based on their preferences or if the differences between the standard and technology-enhanced groups would have been as great if both groups frequented the same intervention website. Some of the media reports about this JAMA study concluded, "wearable trackers may not boost weight loss" or that "activity trackers may undermine weight loss efforts".[4,5] In my opinion, there are far too many variables that were not examined in the study to conclude wearables undermine weight loss efforts. A more balanced assessment is that the type of activity tracker used by this particular group of study participants did not enhance weight loss efforts to the extent expected. This study provides several testable questions for employers and researchers to tackle in the years ahead. For now, employers who are using wearables as part of their efforts should be intentional about selecting the right wearables that will meet their population's needs as well as evaluating the impacts of wearables as part of their programs to ensure they are meeting their goals and objectives.

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About the HERO Reviewer

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Dr. Jessica Grossmeier is the vice president of research at the Health Enhancement Research Organization (HERO), where she oversees the direction and execution of the HERO research agenda. This includes providing research expertise and consultation to HERO study committees, serving as HERO's research liaison to external contractors and study collaborators, and serving as Principal Investigator for HERO-sponsored research studies. Jessica is a workplace health promotion thought leader with 25 years of experience advancing individual and population health including serving the industry for the past 15 years as an outcomes researcher. She has led numerous research studies on best practices in workplace health and well-being and on the health and financial outcomes of programs sponsored by large, national employers. She has led or contributed to more than 50 published articles in peer-reviewed scientific and industry trade journals and regularly speaks on best practices and outcomes research at national industry conferences.