EDITORIAL AND COMMENT

Leveraging Technology to Manage Obesity in Primary Care: A Work in Progress

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Obesity is a leading health problem in the U.S. due to of its rising prevalence over the last several decades[1] and its etiologic role in many chronic health conditions.[2] Currently, more than one-third of U.S. adults are obese, and the impact of obesity on healthcare cost is enormous, estimated at $147 billion in 2008.[3] Moreover, while the overall prevalence of obesity has begun to plateau somewhat, the cost of healthcare is expected to continue to rise precipitously, as many of these adults age and become senior citizens.[1] Unfortunately, most of this cost is spent on treating the complications and consequences of obesity rather than managing and preventing obesity itself.

In 2012, the U.S. Preventive Services Task Force updated its guidelines,[4] and recommended that clinicians screen all adults for obesity and offer or refer patients with a body mass index of 30 kg/m^2 or higher for intensive, multicomponent behavioral interventions for weight treatment. The new guidelines note that the majority of effective higher-intensity interventions included multiple behavioral activities such as group sessions, individual sessions, setting weight loss goals, improving diet/nutrition and physical activity, addressing barriers to change, and the use of self-monitoring and other strategies to maintain lifestyle changes. These recommendations are echoed in the recently updated guidelines for the treatment of obesity put forth by the American Heart Association, American College of Cardiology, and The Obesity Society.[2] Nevertheless, obesity is still undertreated, especially in the primary care setting. The many barriers to treatment include poor reimbursement from healthcare payers for such intensive behavioral interventions and the lack of cost-effective and feasible interventions that can be scaled to reach the majority of Americans suffering from obesity.

In this issue of the Journal of General Internal Medicine, Levine and colleagues[5] reviewed the evidence supporting weight control interventions that are potentially suitable for implementation in real-world primary care settings. They focused on studies that leveraged various technologies, anticipating that these technologies would reduce cost, improve patient adherence by removing logistical barriers, and are more likely to be scalable. Patients in 12 of the 16 studies that they reviewed achieved significant weight loss compared to controls, although the magnitude of weight loss varied (0.08 to 5.4 kg). Ten studies reported outcomes at one year or beyond. The interventions used various combinations of personnel, technology modalities, and behavior change principles. Physicians were often involved in interventions. Web-based applications were used in more than 60 % of interventions, and interventions tended to incorporate behavioral strategies such as self-monitoring. The review found that most interventions that included clinician-guided software or feedback from personnel appeared to promote greater weight loss than fully automated interventions. However, despite occurring in primary care settings, many studies had only fair pragmatism scores.

While the review by Levine et al.[5] suggests some promise in the use of technology-based interventions to improve weight loss in primary care settings, many questions and challenges remain. Interventions were heterogeneous, and levels of weight loss ranged widely from marginal to modest. While it is generally believed than even modest levels of weight loss are beneficial, whether that level of weight loss is sustainable and ultimately cost-effective when disseminated more broadly remains an open question. The wide range in outcomes of interventions that share similar conceptual behavioral principles points to the importance of implementation and the ongoing evaluation of such interventions once in practice. The outcome of weight loss is also only a proxy measure for the hard endpoints, i.e., the prevention of obesity-related comorbidities that we are most interested in. Whether these levels of weight loss for the duration measured in these studies will make a real difference is uncertain. Finally, most of the intervention studies were developed de novo within the communities and the practice settings studied, and it would be difficult to replicate these and assess for the generalizability of their effect without some effort to make these interventions publicly available.

Among the interventions reviewed, perhaps the most promising were those described in two studies, the first by Appel et al.[6] and the second by Ma et al. Appel et al. randomized 415 obese patients with at least one cardiovascular risk factor from six primary care practices. One intervention provided patients

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with weight loss support remotely – through the telephone, a study-specific website, and e-mail. The other provided in-person support during group and individual sessions along with the three remote means of support. At 24 months, patients in the control group where weight loss was self-directed had lost 0.8 kg, whereas the remote-support-only group had lost 4.6 kg and the in-person-support group had achieved weight loss of 5.1 kg. The percentage of patients who had lost 5 % or more of their body weight were 18.8 %, 38.2 %, and 41.4 %, respectively. The remote-only intervention is particularly promising in light of its potential for scalability. The theoretical framework for both active interventions was based on social cognitive theory and incorporated behavioral self-management approaches designed to help participants achieve weight-related goals, self-monitor weight, exercise and reduce calorie intake, increase self-efficacy and social support, and solve problems. Motivational interviewing techniques were used in in-person and remote interactions with participants. Participants were also encouraged to log on weekly to a study website that provided learning modules, self-monitoring tools, and feedback on progress. In the group receiving remote support only, the median number of completed calls was 14 in the first six months and 16 in the subsequent 18 months; participants in both active intervention groups used the website frequently. The remote-only intervention is now commercially available to employers on a larger scale, but not directly available to consumers or healthcare provider organizations.

Ma et al.'s study[7] evaluated two adapted lifestyle interventions based on the Diabetes Prevention Program (DPP) compared to usual care.[8] The DPP lifestyle intervention had previously been shown to be effective in sustaining weight loss of 5.6 kg (vs. 0.1 kg in the control group) at three-year follow-up and in reducing the risk of developing diabetes by approximately 50 % among obese patients at risk for developing the disease. One of the active interventions in Ma's study was a coach-led group intervention similar to the original DPP, whereas the second active intervention was similar in content but completely remotely delivered via e-mail, electronic health records, and the study website. At 15 months, the coach-led intervention group had sustained weight loss of 6.3 kg and the remote-intervention group had achieved weight loss of 4.5 kg, compared to 2.4 kg in the usual-care group. Secondary analyses suggested that women in the coach-led arm did much better than those in the remote arm (−6.9 kg vs. -3.9 kg), whereas results in the two arms were comparable among men (−5.6 kg vs. -5.1 kg).

One major issue not directly addressed in Levine's review[5] is the level of participation of patients who were eligible for recruitment. There is a concern with technology-based interventions that this approach may worsen health disparities, given the potential digital divide between the "haves" and "have-nots." Many of the studies reviewed did report on the participation rates from the patients they approached, with some rates much higher than others, but many studies did not report the reasons for lack of interest and potential barriers faced by patients. Appel et al.[6] reported that 415 patients were recruited from a registry of 1,370 . In Ma's study,[7] of 1,576 potentially eligible patients whom investigators attempted to contact, 972 (62 %) declined and 363 (23 %) were unreachable. If the intent of these interventions is to make them scalable and easily disseminated, it is important to understand the appeal and accessibility of the interventions to unselected obese patients seen in primary care, especially those who are disadvantaged. Another issue is how patients are approached about their obesity. There is extensive evidence to suggest that healthcare providers, and the healthcare system in general, have not historically approached obese patients with the appropriate sensitivity and empathy, and this bias is perceived by patients, often resulting in patients avoiding necessary care, including preventive care, in a timely manner.[9–11] There is a risk that broad efforts to systematically target obese patients about their weight, especially with an approach lacking individualization and sensitivity, may be counterproductive and may further alienate patients.

In summary, recent studies focused on pragmatic interventions that leverage technology to address obesity in primary care settings are an important step in tackling the problem of obesity. Interventions described in the studies by Appel[6] and Ma[7] show especial promise, and ideally should be made commercially available to clinical practices so that these approaches may be tested on a larger scale and in more diverse clinical populations to determine their sustainability, scalability, and ultimately, their cost-effectiveness. In particular, more work is needed to ensure that disadvantaged populations are not left behind, and that patients with obesity are not further alienated from the healthcare system.

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