A Multisensory Approach to Monitor Bariatric Patients' Postsurgical Behavior and Lessen Weight Recidivism

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Introduction

Obesity has been on the rise in recent decades and created a significant burden on health care. Bariatric surgery has emerged as the most effective treatment to help severely obese patients. Despite the major success of bariatric surgery, a significant amount of weight recidivism and failure of sustained weight loss is still seen. One study showed that up to 20% of patients regain a significant amount of their weight after surgery. The purpose of our research is to determine if monitoring bariatric patients' pre- and postoperative compliance with active and passive sensors can bolster bariatric patients' progress and lessen weight recidivism.

Discussion

Meetings amongst multidisciplinary team members have been held monthly to design a sensor model to lessen weight recidivism for postoperative weight loss surgery patients. One key challenge for bariatric surgeons is monitoring patients and knowing when they deviate from recommended postsurgical guidelines. These sensors will help clinicians know when to step in by providing aggregated data of all the parameters to be measured. The intervention can range from phone calls to offer reminders to more frequent office appointments to discuss progress in person. Early interventions by the surgeon and psychologist will help identify patients' individual barriers to success and help patients to stay on track.

Methods

A bariatric surgeon, computer scientists, and a psychologist are working together to develop a program designed to bolster weight loss in bariatric surgery patients. In our mobile digital health solution, we use a smart application coupled with sensors to monitor patients' compliance with lifestyle modifications before and after surgery. The sensors include a wireless scale, an activity and sleep hygiene monitoring wristband, a water bottle sensor and a pill bottle sensor which prompt patients to hydrate and to take their supplements. The data will be collected on the app so both the patient and researchers can track individual progress. The app will also ask patients to fill out a nightly survey that will help in monitoring their diet and emotional well-being.

Conclusion

Despite the major success of bariatric surgery, a significant amount of weight recidivism and failure of sustained weight loss is still seen. After surgery, a lifelong commitment to behavioral and dietary modifications is necessary and not always accomplished long term. As a result, patients can see their obesity related comorbidities return at faster rates the further out from surgery they are. By tracking patients' diets, weights, moods, and physical activity through sensors and our app, we hope to encourage them to make healthy choices and stay on track. The app will force the patients to actively think about what they are doing and eating each day which will help them lose weight. Furthermore, the collected data will alert the physicians when the patient is struggling with their postoperative regimen and allow them to intervene and help early.

Materials

References

1. Adams TD, Gress RE, Smith SC, et al. Long-term mortality after gastric bypass surgery. *New England Journal Med.* 2007; 357:753–761.
2. "Adult Obesity Facts." *Centers for Disease Control and Prevention*. Centers for Disease Control and Prevention, 01 Sept. 2016. Web. 30 Apr. 2017.
3. Mitchell, James E., Nicholas J. Christian, David R. Flum, Alfons Pomp, Walter J. Pories, Bruce M. Wolfe, Anita P. Courcoulas, and Steven H. Belle. "Postoperative Behavioral Variables and Weight Change 3 Years After Bariatric Surgery." *JAMA Surgery* 151.8 (2016): 752. Web. 30 Apr. 2017.
4. Mechanick, Jeffrey I., "American Association of Clinical Endocrinologists, The Obesity Society, and American Society for Metabolic & Bariatric Surgery Medical Guidelines for Clinical Practice for the Perioperative Nutritional, Metabolic, and Nonsurgical Support of the Bariatric Surgery Patient." *Surgery for Obesity and Related Diseases* 4 (2008) S109-S184
5. Shahzeer Karmali, Balpreet Brar, Xinzhe Shi, Arya M. Sharma, Christopher Gara, Daniel W. Birch. (2013) Weight Recidivism Post-Bariatric Surgery: A Systematic Review. *Obesity Surgery* 23, 1922-1933.