

**Promoting Weight Loss Using a Smart Phone Application in Rural Primary Care**

by

Christine A. Shuey

Under Supervision of

Kelsey McGinty, DNP, APRN, FNP-C, RN

Second Reader

Priya Nair, DNP, RN, CCCTM

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### Abstract

**Problem:** Primary care providers have been challenged by national guidelines to be on the front lines of addressing the obesity epidemic. This is a challenging task due to the lack of effective tools for monitoring patient dietary intake and physical activity. Approximately 29% of adults in [Northern Maryland](#) are clinically obese, with a clear health disparity existing in the northernmost communities. Forty one percent of the patients served by a small non-profit community health clinic located in the northern region of [Northern Maryland](#) are obese. **Purpose:** The purpose of this QI project is to integrate a referral process for the use of the Lose It! Weight loss smart phone application for patients with obesity served by the clinic. **Methods:** Patients with obesity will be identified and presented with education regarding the use of Lose-It app. The application is used as a tool for self-monitoring dietary intake and physical activity. The app assists the user in creating a customized weight loss and daily calorie goal and encourages the user to record daily physical activity, daily caloric intake, and weekly weight. Patient BMI, weight and blood pressure will be measured and recorded at baseline and then weekly for a 15-week period. **Results:** The referral process was slow to gain traction early in the process, by the fourth week almost 50% percent of patients with obesity were identified and referred. For the remaining eleven weeks, coinciding dips and increases exist among referrals, weight loss, and blood pressure run charts that indicate points of reengagement of staff and patients by the QI-PL. **Conclusions:** Findings of this project suggest that implementation of the Lose-It! Smart application for patients with obesity has potential to be a useful tool in promoting weight loss and decreasing blood pressure when patients are referred in the primary care setting. Long term follow up is necessary to track patient adherence and weight loss achieved using the application.

### **Promoting Weight Loss Using a Smart Phone Application in Rural Primary Care**

Primary care providers have been challenged by national guidelines to be on the front lines of addressing the obesity epidemic (Kurtzman et al., 2018). Approximately 27% (51,611) of adults in Northern Maryland are obese. One small, rural health clinic in Northern Maryland serves as the setting for the quality improvement (QI) project with a 41% rate of obesity.

Assisting obese patients to achieve a healthy body weight through the self-monitoring of lifestyle modifications may lead to a decrease in adverse health outcomes that are associated with the progression of obesity (United States Preventive Services Task Force, 2018).

Primary care providers can assist patients with weight loss through the promotion of lifestyle modifications as an evidenced based first line treatment recommendation (USPSTF, 2018). Lifestyle modifications may include the integration of regular physical activity and monitoring of caloric intake; both of which require self-monitoring in support of self-awareness and accountability. Traditional paper journals used for self-monitoring can be time consuming and inconvenient leading to a decrease in adherence (Lin, 2014). As the number of adults with obesity continues to rise, the need for a practical tool for self-monitoring is critical (Shapiro et al., 2012).

The purpose of this QI project is to support the achievement of a health body weight by integrating a practical tool for the self-monitoring of lifestyle modifications as a part of the plan of care for obese patients. The tool will exist in the form of the self-monitoring app, Lose-It!, facilitated by smart phone technology due to its simplicity and financial feasibility. Through this tool, patients can track their current body weight, movement, and caloric intake with convenience via their smart phone with daily reminder notifications to support adherence.

### Available Knowledge

The results of five randomized controlled trials that introduce a smart app as part of a weight loss program support this quality improvement project. The five randomized controlled trials included in this evidence synthesis explore the effectiveness of using a weight loss app to track the health-related behaviors of diet, measuring weight, and exercise. The main outcome measured in all studies is the amount of weight lost by participants during the study, two of the studies included a long term follow up for six months and one year. Two studies focus on the popular commercial weight loss app “Lose It,” and one study utilized the commercial app “My Fitness Pal” While all of the studies included the use of a smart app in an intervention group, three of the studies compared use of the app vs. standard of care or paper journaling. One study compared the basic version of the app to the premium version. Another study compares 3 intervention groups all of which use the app to varying degrees paired with other interventions to determine the most effective combination. Some studies include other outcomes such as waist circumference, anthropometrics, blood pressure and skeletal muscle mass. All of the studies included sample populations that were overweight or obese. The sample populations vary from middle to older aged men in rural settings, University attendees, and low-income primary care settings. The intervention groups in all of the studies experience clinically significant weight loss, however sometimes the results were not statistically significantly different from the control group. This might indicate that while a smart app can promote weight loss, it may not be superior to a traditional method.

Common themes suggest a relationship between engagement with the use of a smart app and increased weight loss over time. The studies reflect demographic characteristics similar to the population at the rural health clinic chosen for this project implementation. The body of

evidence was adapted to the clinic setting in a manner that addressed barriers to practice change (feasibility, financial and time constraints, provider and staff motivation).

Using the Knowledge to Action framework, the body of generalizable and demographically relevant, high level research evidence for using a smart phone app to promote healthy weight loss is tailored to fit the needs of a rural health clinic. The framework consists of two main phases: Knowledge Creation, and the Action Cycle (See Figure 2 Knowledge to Action Framework) (Sturgiss & Douglas, 2016). Knowledge creation was conducted by collecting the best available practice evidence to address the clinical problem. Numerous research studies from databases were extracted and appraised for evidence level and quality. The highest level of evidence was then synthesized and presented in table form to stakeholders. The Action Cycle consists of seven components: identifying the problem, adapting knowledge, assessing barriers, implementing, monitoring, evaluating, and sustaining. The process of problem identification began with personal observation of frequent obesity diagnosis, which was further investigated by retrieving internal data which confirmed a high (41%) rate of obesity. The body of evidence was adapted to the clinic setting in a manner that addressed barriers to practice change (feasibility, financial and time constraints, provider, and staff motivation). An implementation plan has been devised, followed by steps for monitoring and evaluating progress in reaching structure, process, and outcome goals. The plan was created to be easily sustainable by the clinic following the implementation period.

### **Methods**

The QI project was created for a specific non-profit facility serving a rural community. Business and operational decisions are made by a nine-member board of directors and one single primary care provider. The staff consists of one office manager, one information technologist,

three secretaries, and two medical assistants. The clinic uses a web-based electronic health record (EHR) for managing patient chart documentation.

Before project implementation, patients managed by the clinic were weighed at the beginning of each visit by the medical assistant. The provider reviewed the patient's weight and compared it with weights measured during previous visits. When a patient was identified as obese, the provider provided counseling and guidance for healthy weight loss in an unstructured format. This included suggestions for healthy lifestyle changes that were personalized to the patient and the discussion was documented in the EHR.

The preexisting process was changed as little as possible in the effort to support staff acceptance of the initiative. The medical assistant continued to bring the patient back to the exam room and measured the patient's height and weight through the use of a measurement stick, and meter scale located in each exam room. The medical assistant entered the height and weight into the electronic health record which automatically calculate the patient's body mass index (BMI); if the patient met criteria for obesity, the medical assistant placed a copy of directions for downloading and using the Lose It! app for weight loss on top of the patient chart for the provider to see. When the provider entered the room to see the patient, the copy of the directions on top of the chart prompted the provider to provide obesity counseling and then provide the directions to the patient for downloading the app to their smart phone. Patient weight and BMI data was collected on a weekly basis and updated into the EHR (See Appendix A, Figure 1: Process Map). During the implementation period, open communication between provider, staff and QI-PL remained open to facilitate project implementation.

Structural, process, and outcome measures were utilized to determine the impact of self-monitoring using the Lose-It! App. Installation of the Lose It! App onto the smart phones of all

patients identified with obesity was a structural goal to promote improved patient outcomes. This structure goal is achieved during provider referral at an office visit and documented in the plan for obesity management by the provider. The project also required a change in the process for the practitioner, who included the use of the app as part of weight loss counseling during the office visit. This is documented in the obesity plan in the patient chart.

Patient BMI and blood pressure data was collected to study the proposed practice change process and outcomes. The outcome goal during the implementation period was a 10-pound reduction in weight and 10-point reduction in blood pressure. Since rapid weight loss is unhealthy and not encouraged, success towards project goals was measured as any amount of weight loss/reduction in blood pressure and progress towards a healthy weight and blood pressure.

Validity and reliability of BMI and blood pressure measurements was critical in maintaining the integrity of the data collected during project implementation. Weight is operationally defined as the magnitude of force between the patient and the health-o-meter scale and is expressed in pounds. The scales were calibrated according to the manufacturer's instructions. Patients had their weight measured using the health-o-meter scales found in the office and were instructed to wear light clothing for weight measurement. Height was measured in inches using wall measurement devices which were checked for accuracy prior to implementation. Patients were instructed to remove shoes and headwear for accurate height measurement. BMI is defined as weight in kilograms divided by height in meters to the second power.

Data was accessible via the Veracity electronic health record. At the request of the clinical site representative, the information technologist compiled a report of patients with an

existing diagnosis of obesity that had an encounter during the implementation period and beyond. These reports were useful in tracking the number of patients with obesity that received provider referral, as well as changes in patient weight and blood pressure that occur after the implementation period as a sustainability measure. The QI-PL had access to the EHR to complete chart audits to track provider referrals. Efforts have been made to ensure this quality improvement project is conducted in a manner that maintains the key principles of ethics. This quality improvement project was reviewed by the Human Rights Protection Office of the University of Maryland School of Nursing to ensure the project met the criteria for a non-human subjects research determination. Research Electronic Data Capture (REDCaps) was utilized to collect and manage project data.

### **Results**

Descriptive statistics revealed that a comparable number of males (n=5, 45%) and females (n=6, 55%) participated in the project. The majority of participants have a BMI in the obese range ( $30\text{-}30\text{kg/m}^2$ ), with other participants being overweight ( $25\text{-}29.9\text{kg/m}^2$ ) or morbidly obese ( $30\text{kg/m}^2$  or greater). Table 1 located in Appendix B summarizes the demographic characteristics of the participants in terms of gender and initial BMI.

Most patients were not able to provide data every week due to time constraints and limited transportation means, therefore the percentages were calculated based on the total number of patients that provided data.

Run charts were created to correlate with the identified goals of measurement in response to the change and include the percentage of patients experiencing weight loss, percentage of patients experiencing a decreased blood pressure, and the percentage of provider referrals (Appendices C, D and E). Percentage of referrals is the best indicator of the success of this



project because they show adoption of the new process flow by the clinic, and therefore promote sustainability. While slow to gain traction, the process was easily implemented. The delay in provider referral initiation is attributed to confusion in referral delivery and resistance to change. This was overcome with onsite facilitation by the QI-PL. Oversight and communication between the QI-PL and clinic staff ensured the implementation was sustained. Changes in weight and blood pressure over time is best measured on a long-term basis. The dips and increases in percentages of patients who experienced weight loss or a decrease in blood pressure show a great degree of variation due to the difficulty in making changes in these variables over a short period of time. The sustained trend of increased provider referrals demonstrates a lasting process change.

Overall, the project was received well by provider, clinic staff and patients. The clinic has decided to continue to recommend the Lose-It! App to its patients beyond the fifteen-week project time period and has streamlined the referral process into patient care.

### **Discussion**

The success of strategies and tactics utilized to implement the QI project are demonstrated through a gradual increase in patient referrals. Results mirror those of the body of evidence on which it is based. Smart apps are a useful tool in promoting weight loss, and this is best measured on a long-term basis. Smart apps are convenient, zero to low cost and easy to implement in the majority of populations in the United States where cell phone use is ubiquitous. This project is limited in its ability to demonstrate an increase in adoption of healthy lifestyle choices. Research evidence was appraised, synthesized, and translated into the practice setting to improve patient outcomes and make an impactful change in the health of patients with obesity. This project was able to be implemented with minimal financial resources.

### **Conclusions**

The use of a smart phone application proved to be straight forward in the clinic setting due to the application simplicity of use, financial feasibility, and ubiquitous use of cell phones among patients served by the clinic. The practice change fit naturally into the current process at the clinic and offered a streamline approach for providers to address obesity in primary care practice. Spread and sustainability will be maintained through dissemination of the QI project and its results, maintaining engagement of senior leaders, incorporation of the process in orientation for new hires, including mentors and champions in continuing the implementation process, and the establishment of an ongoing sustainability measurement plan. Implications for use in practice include consideration of weight loss as a long-term outcome. Weight loss is not liner and is best tracked over a longer period.

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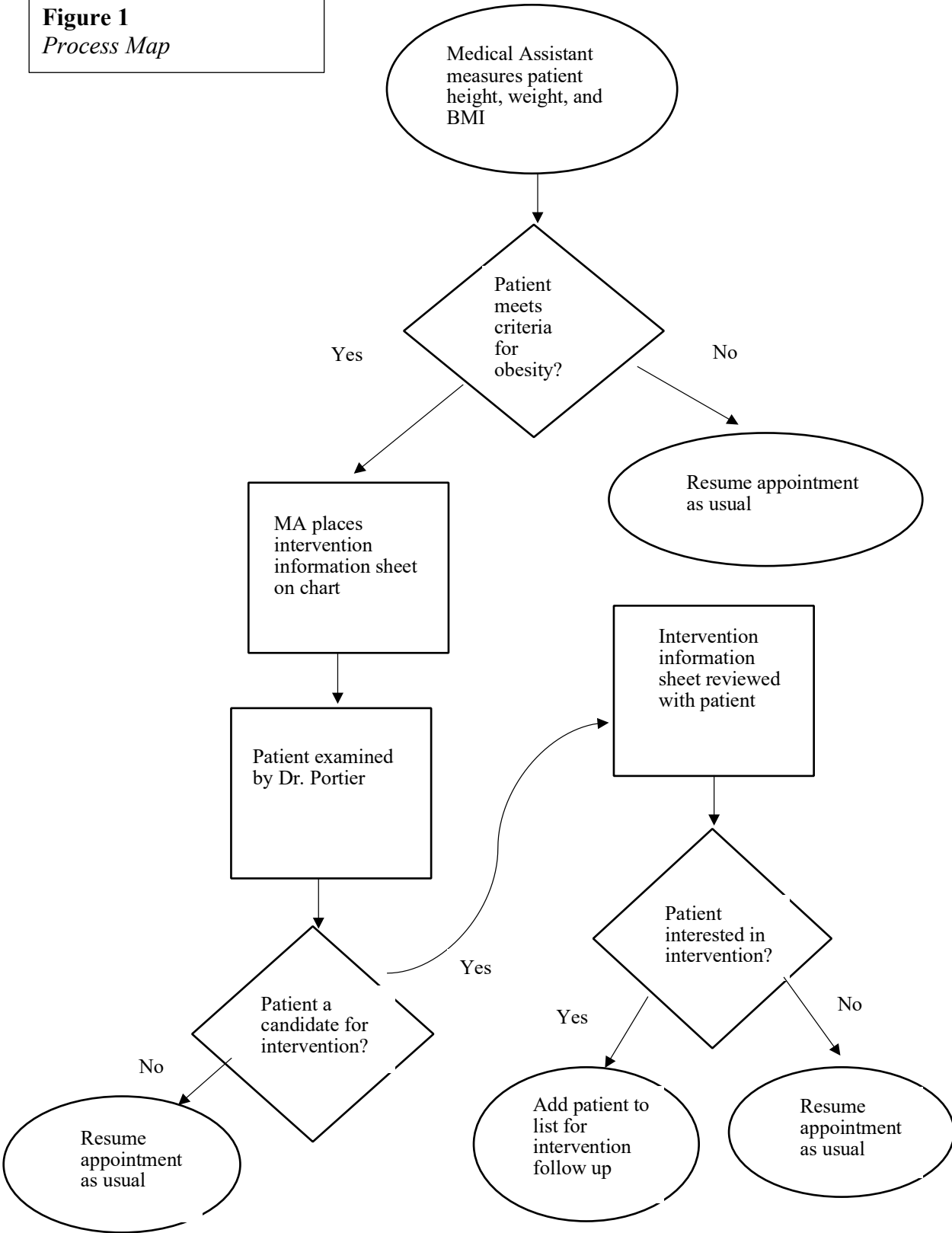
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Appendix A

**Figure 1**  
*Process Map*



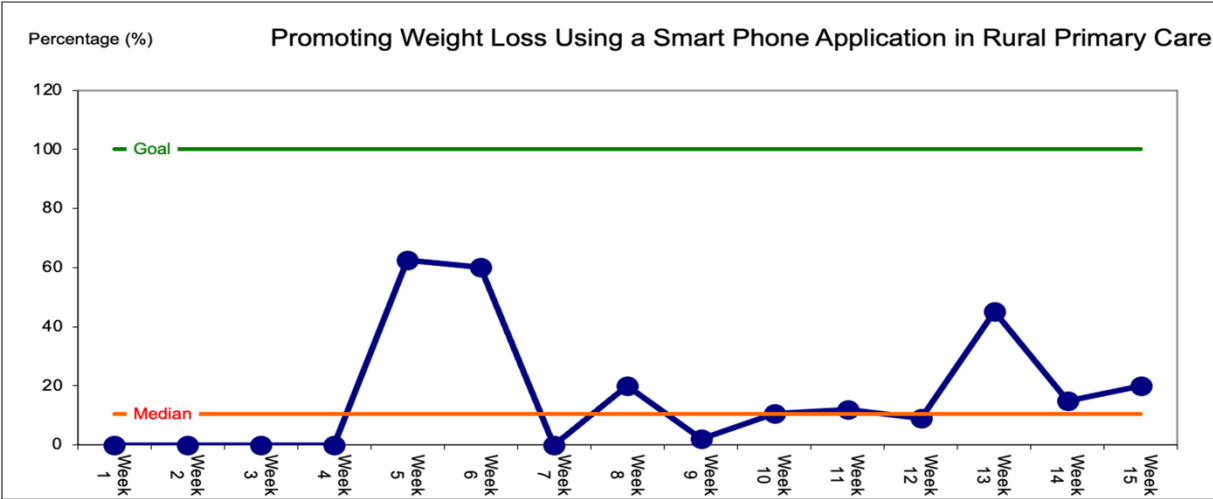
## Appendix B

**Table 1**  
*Participant Demographics (n=11)*

Characteristics	n	%
Gender		
Male	5	45%
Female	6	55%
BMI		
Overweight	1	9%
Obese	8	73%
Morbid Obese	2	18%

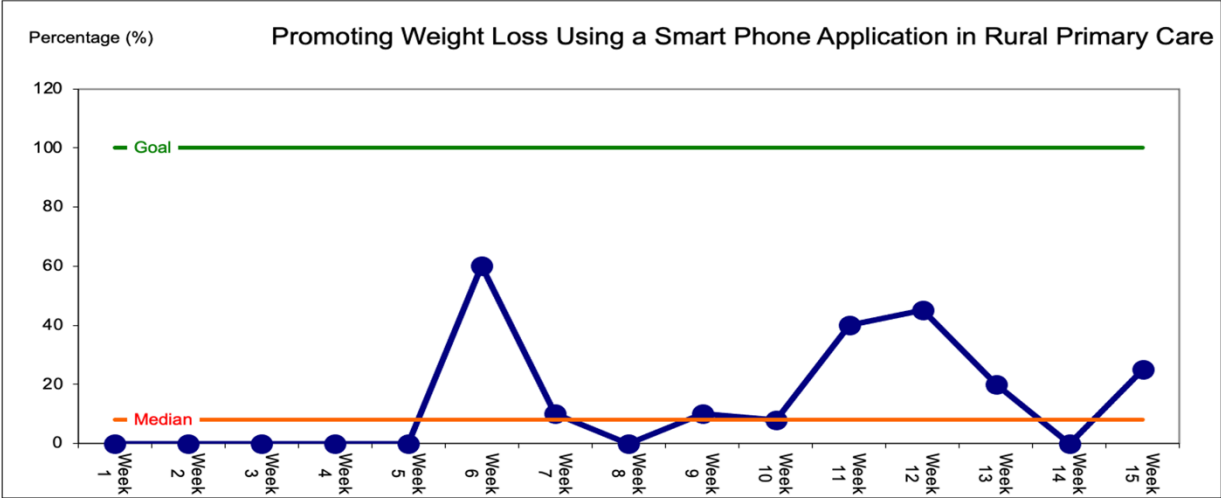
Appendix C

**Figure 1**  
*Weekly Percentage of Patients with Weight Loss*



Appendix D

**Figure 1**  
*Weekly Percentage of Patients with Decreased Blood Pressure*





Appendix E

**Figure 1**  
*Percentage of Provider Referrals*

