

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.JournalofSurgicalResearch.com

Association for Academic Surgery

Use of digital health kits to reduce readmission after cardiac surgery



Imani McElroy, BS, Sohail Sareh, MS, Allen Zhu, BS, Gabrielle Miranda, Hoover Wu, BS, Michelle Nguyen, NP, Richard Shemin, MD, and Peyman Benharash, MD*

Division of Cardiac Surgery, Department of Surgery, David Geffen School of Medicine at UCLA, Los Angeles, California

ARTICLE INFO

Article history:

Received 3 February 2016

Received in revised form

19 March 2016

Accepted 15 April 2016

Available online 23 April 2016

Keywords:

Surgical readmissions

Cardiac surgery

Digital health kits

Patient satisfaction

Readmission reduction

Telehealth

Outcomes

ABSTRACT

Background: Unintended rehospitalizations after surgical procedures represent a large percentage of readmissions and have been associated with increased morbidity and cost of care. Beginning in 2017, Medicare will expand diagnostic categories subject to financial penalties for excess postoperative readmissions to include coronary revascularization procedures. Arrhythmias and pulmonary complications comprise the largest categories for readmission after cardiac surgery. Technologic advances in remote monitoring have led to the use of web-based digital health kits (DHK) aimed at reducing readmissions and improving postoperative outcomes. The present study was performed to determine the added benefit of incorporating DHK's into a formal readmissions reduction program (RRP) in preventing 30-d readmissions and to evaluate patient and provider satisfaction with the use of these devices.

Materials and methods: This was a prospective study of all adult patients who underwent cardiac surgery at our institution from March 2014 to June 2015. During the study period, 443 adult patients (mean age, 65 ± 14 , 33% female) were identified and participated in the formal RRP, 27 of whom also received a DHK after discharge (416 control group). In addition to providing a live video link to a provider specializing in cardiac surgery, the DHK also allowed for automatic daily transmission of weight, oxygen saturation, heart rate, and blood pressure. Patients also completed a daily health survey targeting symptoms concerning for heart failure, poor wound healing, poor ambulation, and nonadherence to medications. Abnormal vitals or survey responses triggered automatic notifications to the healthcare team. Satisfaction surveys were administered to participants and members of the healthcare team. Pearson χ^2 test and the Welch's t-test were used to assess statistical differences in baseline characteristics and outcome variables.

Results: During the study period, the readmission rate for the DHK and control groups were similar (7.4% versus 9.9%, $P = 0.65$). The use of DHKs led to 1649 alerts and 144 interventions, with the highest number of alerts occurring during d 5-9. The majority of alerts (64%) were prompted by abnormal biometric measurements, and a significant correlation was noted between abnormal biometrics and required intervention ($r = 0.62$, $P < 0.001$). No correlation was seen between alerts because of health survey responses ($r = 0.07$, $P = 0.71$) or missed

* Corresponding author. Division of Cardiac Surgery, UCLA Center for Health Sciences, 10833 Le Conte Avenue, Room 62-249, Los Angeles, CA 90095. Tel.: +1 310 206 6717; fax: +1 310 206 5901.

E-mail address: Pbenharash@mednet.ucla.edu (P. Benharash).

0022-4804/\$ – see front matter Published by Elsevier Inc.

<http://dx.doi.org/10.1016/j.jss.2016.04.028>

check-ins ($r = 0.06$, $P = 0.76$) and required interventions. Poststudy satisfaction surveys showed an overall satisfaction rating of 4.9 ± 0.5 for DHK patients and 4.9 ± 0.2 for members of the care team (scale 1–5, 5 = agree).

Conclusions: In our study, adding DHKs to a formal RRP was not associated with a significant decrease in 30-d readmission rates. We also found that notifications because of abnormal biometric measures were significantly correlated with required interventions. In contrast, notifications due to abnormal health survey responses were not associated with increased interventions. Both patients and members of the healthcare team were highly satisfied with this technology. DHKs appear to extend care beyond the inpatient period and provide a portal for telemonitoring of surgical patients. However, this modality is highly resource intensive and may not significantly reduce readmissions. Further studies are warranted to evaluate the efficacy of such kits in reducing readmissions and costs of care.

Published by Elsevier Inc.

Introduction

Postoperative readmission reported to occur in 17.4% of coronary revascularization patients¹ is associated with increased mortality, reduced patient satisfaction,² and significant increases in healthcare costs.³ With recent evidence suggesting that readmission rates may be correlated with quality of care,^{4,5} a Hospital Readmissions Reduction Program was implemented under the Affordable Care Act requiring the Centers for Medicare and Medicaid services to reduce payments to institutions with “excess readmissions.” These financial penalties, which may be as high as 3% of the total institutional Centers for Medicare and Medicaid services payment, are currently applicable to the following diagnoses: acute myocardial infarction, heart failure, chronic obstructive pulmonary disease exacerbations, pneumonia, and joint replacements. With imminent plans to expand the list to include coronary artery bypass grafting in 2017, some state organizations such as the California Coronary Artery Bypass Grafting Outcomes Reporting Program have already mandated public reporting of readmission rates.^{6,7}

Innovative strategies aimed at reducing readmission rates have been used in the postdischarge management of patients. A number of studies have demonstrated the variable success of these programs, which have focused primarily on patient education, assisted medication administration, and organized coordination of care after discharge.^{8,9} Paradoxically, Kwok et al.¹⁰ noted higher readmission rates after implementation of home visits by nurses. Nevertheless, it is generally accepted that fragmentation of care after discharge plays a vital role in unplanned rehospitalizations.^{11,12} Wireless health technologies including video and telemonitoring of vital signs have recently been used to improve continuity of care. Despite success in nonsurgical patients, the impact of telemonitoring in reducing readmissions has not been previously evaluated in those undergoing cardiac surgery.

Historically, the rate of readmission after cardiac surgery has varied between 16% and 22%. With an initial focus on identifying factors contributing to readmissions,¹³ we have developed targeted interventions to reduce unplanned rehospitalizations at our institution. Our Readmissions Reduction Program (RRP) was developed with the purpose of improving patient education and the coordination of postdischarge care. The purpose of the present study was to evaluate the added

benefit of incorporating a telehealth-based component to the RRP in reducing readmissions after cardiac surgery.

Materials and methods

Patients undergoing cardiac surgery at our institution between March 2014 and June 2015 were eligible for inclusion in this study. Transplantation, extracorporeal membrane oxygenation, and ventricular assist device insertion were indications for exclusion from analysis. All patients participated in the RRP, which was developed by a multidisciplinary committee consisting of physicians, nurses, and case coordinators. Figure 1 provides a detailed description of the components included in the RRP. As part of the protocol, patients participated in a formal preoperative education program consisting of face-to-face sessions with the health team. Topics such as preoperative preparation, expected hospital course, proper medication administration, and potential postoperative complications were discussed at these sessions, with educational material provided for patients and their caregivers. Postoperatively, patients received daily education and reinforcement on topics pertaining to at-home care. The second focus of the RRP was to improve postdischarge care. A plan was developed to ensure all necessary home medications were dispensed, and all follow-up appointments were scheduled before discharge. At last, patients were required to identify trusted individuals who would serve as a primary caregiver at home.

In addition to the formal RRP, patients enrolled in a telehealth pilot study also received a digital health kits (DHK) consisting of a tablet linked to a Bluetooth-enabled pulse oximeter, heart rate monitor, blood pressure cuff, and weight scale. Tablets were equipped with software that provided patients with simple illustrated instructions on how to obtain real-time data of vitals including oxygen saturation, heart rate, blood pressure, and weight (Fig. 2). Patients also completed daily digital questionnaires aimed at identifying symptoms consistent with heart failure, poor wound healing, as well as data on ambulation and adherence to medications (Fig. 3). Abnormal biometrics (O_2 saturation $<92\%$, heart rate >95 or <60 beats per minute, systolic blood pressure >150 mm Hg or <90 mm Hg, or weight change greater than two pounds), concerning survey responses, and a missed digital check-in, triggered an automated notification to the healthcare team.

Download English Version:

<https://daneshyari.com/en/article/4299141>

Download Persian Version:

<https://daneshyari.com/article/4299141>

[Daneshyari.com](https://daneshyari.com)