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EDITORIAL

Poking and Prodding So They Take Their Pills

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Over the last 3 decades, advances in percutaneous coronary intervention (PCI) techniques, technological advancements in catheterization equipment, and newer medications have improved clinical outcomes in patients with coronary artery disease despite operators treating more complex lesions and greater burdens of comorbidities [1]. As more patients undergo these procedures, it becomes more imperative that they adhere to their prescribed medication regimens, including dual antiplatelet therapies, as well as lifestyle changes, which significantly reduce the incidence of post-PCI cardiovascular events and the need for repeat revascularization. Just last week, I received a call overnight from a patient who could not remember if he had taken the evening dose of his anti-platelet agent, despite having a pill box and help from family members. At least a fifth of patients treated with 1 year of dual anti-platelet therapy are non-adherent for a variety of reasons [2]. Clinicians must investigate innovative ways to promote treatment adherence among patients.

In this issue of Cardiovascular Drugs and Therapy, Krackhardt et al. report the results of a randomized trial ("Me & My Heart" eMocial Study) providing post-discharge patient support via a smartphone-based support tool app [3]. They studied its effect on self-reported adherence to medication and lifestyle modification in patients prescribed ticagrelor for acute coronary syndromes (ACS). Adult patients treated for ACS with ticagrelor and aspirin were randomized to follow-up with or without the support tool app and observed for 48 weeks. The app provided medication intake reminders and motivational messages to patients in the study group. Patients reported on adherence to the medication at week 1 and then again at the end of the study, and patients' blood pressure and body mass index were also measured at these times. The investigators report that the absolute between-group difference in adherence to ticagrelor was 4.9 percentage points, favoring the group using the app. Among survey respondents, patient adherence to ticagrelor was higher in the study group over the control group throughout the entire study period.

The strength of this study comes from providing individualized support for patients in the active arm—each patient could choose the level of interaction received from the support tool, including daily medication reminders, motivational messages, and graphical displays of their cardiovascular risk based on their lifestyle choices. Study participants reported better adherence (> 90% in both the active and control groups) than the 50–60% reported by other studies. One of the biggest impacts of the app was an improvement in lifestyle modification factors including increased exercise frequency and smoking cessation in the active group compared to the control group. Another advantage was the potential impact on healthcare literacy, which has been associated with cardiovascular disease outcomes and healthcare usage. While there were no significant differences between the two groups on overall disease understanding, significantly fewer patients in the active group believed it was harmless to miss a dose of ticagrelor, and significantly more patients understood why they were taking the medication.

This study is noteworthy in that the investigators had no communication with patients outside of the support tool app itself—there were no study-specific follow-up visits except for the baseline and end-of study visits. The response rate was low: 50.9% in the app group and 52.1% in the control group. Furthermore, as the investigators note, the survey tools were developed for this study and have not been independently validated. The study was performed in Germany, where unique healthcare and payment

Key Points - Medication adherence and lifestyle modification reduce the risk of post-PCI cardiovascular complications in patients treated for acute myocardial infarction.

- This app-based support tool increased self-reported adherence to medication, exercise frequency and smoking cessation in patients compared to a data collection app alone.

- Further investigation is needed on why this study population reported higher rates of medication adherence at baseline compared to historical studies.

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systems may impact medication adherence differently than in other countries. The patients in the study also all had access to smartphones by which they could participate, which would preclude patients who either cannot afford or cannot use cellphones.

Annually, 1.3 million patients are discharged after suffering an acute coronary syndrome, and over 900,000 patients undergo PCI in the USA [4]. Various methods are being investigated to improve patient adherence to both post-ACS medication regimens and lifestyle changes in order to improve clinical outcomes for these patients, who are at high risk of further cardiovascular events. Ho et al. trialed a 4-step medication delivery and phone follow-up outreach process that produced mixed results—an increase in medication adherence, but also an increase in need for repeat revascularization [5]. Smart blister packs which monitor day-to-day variability adherence in medications are easy to use and provide more objective data than pill counting and self-reporting by patients [6]. Tablets with embedded sensors that detect contact with gastric acid and transmit ingestion events to external monitors have been approved for other diseases like schizophrenia [7]. These beg the question of how far we are willing to go into the private lives of our patients to ensure they take their DAPT. Developing a support tool app may be one of the least invasive ways in which we can encourage our patients to follow their treatment plan, and this deserves further investigation into whether such interventions improve not only compliance but clinical outcomes.

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Declarations

Ethics Approval This editorial did not contain research involving human or animal subjects.

Consent to Participate This editorial did not include research involving human subjects so informed consent was not applicable.

Consent for Publication The authors affirm that there were no human research participants so consent for publication was not an issue.

Competing Interests The authors declare no competing interests.

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