Pill Packing Intervention and its Impact on Health Outcomes

Saira Amjed[1], MD, Patrick Brown[2], Molly Anapolsky[3], Rees Ryckman[3], Paige Pielet[4], Kathy Jo Carstarphen[1,5], MD

[1]Internal Medicine Residency, Ochsner Health; [2]The University of Queensland Faculty of Medicine, Ochsner Clinical School,
[3]Tulane University School of Science and Engineering; [4]Tulane School of Public Health and Tropical Medicine; [5]Internal Medicine, Ochsner Health

Introduction

It is common for patients to miss doses of medications prescribed for chronic diseases, with the most self-reported reason being difficulty remembering whether they had consumed a specific dose.[1] Polypharmacy is the regular use of at least five medications. Skipped medication doses and polypharmacy lead to poorly controlled chronic conditions, higher morbidity, and increased hospitalizations[1,2]. Pill Packing (PP) provides a mechanism for patients with polypharmacy to self-monitor medication consumption and limit the decision-making burden about which medications to take at different times[3].

The Ochsner Pharmacy and Wellness has performed PP for the MedVantage Clinic (MVC), a primary care hub for complex patients, since 2017. In 2019, Yeung et al. (2019) demonstrated that PP in conjunction with the MVC improved health markers for this cohort. Systolic BP (SBP), hemoglobin A1c (HbA1c), and low-density lipoproteins (LDL) levels significantly improved. When uncontrolled, these markers are risk factors for cardiovascular disease (CVD) incidents, such as myocardial infarctions (MI) and cerebral vascular accidents (CVA). This study aims to explore the PP impact on health markers and further investigate whether CVD incidents are also impacted.

Methods

A retrospective chart review was performed on 75 MVC patients currently utilizing PP. To be included, patients had to be a current MVC patient, enrolled in PP for at least 6 months, and have at least one of the following conditions treated with medication in their pill pack: hypertension, type 2 diabetes, and hyperlipidemia. Patients were excluded if they either were not enrolled in pill packing for at least 6 months or did not have any A1c, SBP, or LDL measurements within 6 months after the intervention. We also reviewed major CVD events (MI and CVA) and ED visits in the 6 months following pill packing initiation.

We used a paired sample t-test to compare the average A1c, SBP, and LDL values from before the intervention and after the intervention. We calculated the cumulative incidence of MI and/or CVA.

Results

Figure 1. Dispill pill packs[5].

Among the 75 patients included in this study, average SBP, LDL, and A1c levels all improved 6 months after the PP interventions. However, these results were not statistically significant.

Prior to the intervention, average A1c among this cohort was 7.92. 6 months after PP, average A1c was 7.80 (p=0.73). SBP 6 months prior to PP was 136. 6 months after PP, the average SBP was 134 (p=0.60). Average LDL prior to PP was 100. After 6 months, it was 89 (p=0.240).

	6 months prior	6 months after	p-value
HbA1c (%)	7.92	7.80	0.73
SBP (mmHg)	136	134	0.6
LDL (mg/dL)	100	89	0.24

Table 1. A1c, LDL, SBP 6 months prior to and after pill packing.

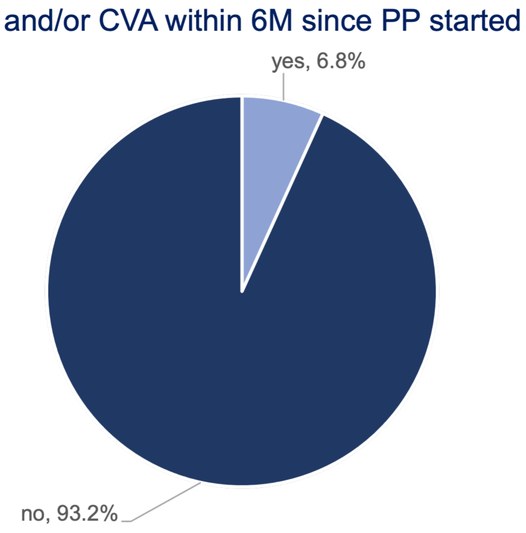

Figure 2. Cumulative incidence of MI and/or CVA within 6 months after PP.

Discussion

Although all health markers improved with PP, the changes were not statistically significant. We believe this may be due to our small sample size resulting from our exclusion criteria.

Many patients in the MVC cohort have multiple comorbidities and are considered at higher risk for COVID-19 complications based on the Epic COVID Risk Score[6]. Throughout 2020, many patients switched to virtual and telephone visits to limit COVID exposure, which consequently resulted in missed lab draws and missing records of vital signs in the clinic environment. Due to quarantine restrictions, exercise routines and diet were negatively affected as well[7].

Interpretation of the major CVD cumulative incidence of 6.8% was unclear due to a lack of data in this category for a matched population. Analysis is pending regarding the major CVD events in the 6 months prior to PP.

Conclusions

Given prior results from the Yeung et al. study on this cohort in 2019, we expected statistically significant improvements in A1c, SBP, and LDL levels following PP intervention. Further research is needed to determine the possible interplay between the COVID-19 pandemic and PP practices that may have reduced its impact on health markers. Additionally, a comparison of this CVD incident rate to a matched control group or an analysis of the data 6 months prior to PP will need to be performed to determine the impact of PP on major CVD incident.

References

1. Wolf, M. S., Curtis, L. M., Waite, K., Bailey, S. C., Hedlund, L. A., Davis, T. C., ... & Wood, A. J. (2011). Helping patients simplify and safely use complex prescription regimens. *Archives of internal medicine*, *171*(4), 300-305.
2 Zedler, B. K., Kakad, P., Colilla, S., Murrelle, L., & Shah, N. R. (2011). Does packaging with a calendar feature improve adherence to self-administered medication for long-term use? A systematic review. *Clinical therapeutics*, *33*(1), 62-73.
3. Mahtani, K. R., Heneghan, C. J., Glasziou, P. P., & Perera, R. (2011). Reminder packaging for improving adherence to self-administered long-term medications. *Cochrane Database of Systematic Reviews*, (9).
4. Yeung, G., Semana, R., Huynh, T., & Rovira, R. (2019). The Impact of MedVantage Clinic and Primary Care and Wellness Pharmacy Partnership on Medication Compliance and Health Outcomes. *Research Gate*. University of Queensland .
5. Marketing Material. (2020, August 17). Retrieved May 2, 2021, from https://dispill-usa.com/marketing-material/
6. COVID-19 Risk Model Now Available to Health Systems Around the U.S. (2020, November 9). Retrieved May 2, 2021, from https://www.epic.com/epic/post/covid-19-risk-model-now-available-health-systems-around-world
7. Sepúlveda-Loyola, W., Rodríguez-Sánchez, I., Pérez-Rodríguez, P., Ganz, F., Torralba, R., Oliveira, D. V., & Rodríguez-Mañas, L. (2020). Impact of social isolation due to COVID-19 on health in older people: Mental and physical effects and recommendations. *The journal of nutrition, health & aging*, 1-10.